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(54) **CANNABIS BASED THERAPEUTIC AND METHOD OF USE**

(57) The present disclosure relates to cannabinoid-based therapeutics, and their use in treating pain, e.g., chronic pain. The present disclosure also relates to cannabinoid-based therapeutics, and their use in treating opioid addiction.

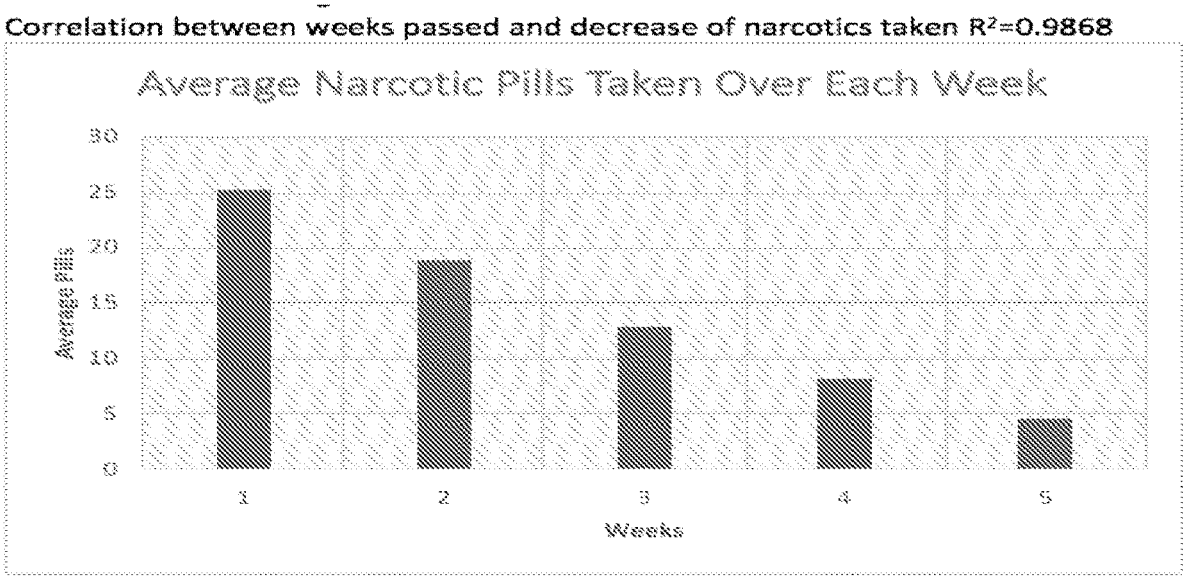

Fig. 1a

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Description

CROSS-REFERENCE

[0001] This application claims the benefit of U.S. Provisional Application No. 62/634,547, filed February 23, 2018, which application is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] There is a need in the art for methods and compositions to manage pain, e.g., chronic pain. There is also a need in the art for methods and compositions for treating opioid addiction.

SUMMARY OF THE INVENTION

[0003] Disclosed herein are pharmaceutical compositions comprising: tetrahydrocannabinol (THC) and cannabidiol (CBD) in a THC:CBD ratio of from 1:1.5 to 3:1 by weight; and one or more terpenes. In some embodiments, the THC:CBD ratio is from 1.5:1 to 2:1. In some embodiments, the THC:CBD ratio is about 1.5:1.

[0004] In some embodiments, the pharmaceutical composition comprises about 15- 20 mg tetrahydrocannabinol (THC) per dose. In some embodiments, the pharmaceutical composition comprises 10 - 12 mg cannabidiol (CBD).

[0005] In some embodiments, the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, α-humulene, linalool, p-cymene, camphene, cis-nerolidol, terpinolene, isopulegol, caryophyllene oxide, δ-limonene, geraniol, guaiol, α-bisabolol, 3-carene, β -pinene, γ-terpinene, or a combination thereof. In some embodiments, rein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, and α-humulene.

[0006] In some embodiments, the one or more terpenes comprise β-myrcene, and wherein the pharmaceutical composition comprises 30 - 60 mg of β-myrcene per dose.

[0007] In some embodiments, the one or more terpenes comprise β-caryophyllene, and wherein the pharmaceutical composition comprises 2.5 - 5 mg of β-caryophyllene per dose.

[0008] In some embodiments, the one or more terpenes comprise ocimene, and wherein the pharmaceutical composition comprises 2.3 - 4.7 mg of ocimene per dose.

[0009] In some embodiments, the one or more terpenes comprise α-pinene, and wherein the pharmaceutical composition comprises 1.1 - 2.1 mg of α-pinene per dose.

[0010] In some embodiments, the one or more terpenes comprise α- humulene, and wherein the pharmaceutical composition comprises 0.8 - 1.6 mg of α- humulene per dose.

[0011] In some embodiments, the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, and α-humulene; and wherein the pharmaceutical composition comprises about 30 - 60 mg of the β-mycene, about 2.5 - 5 mg of the β-caryophyllene, about 2.3 - 4.7 mg of the ocimene, about 1.1 - 2.1 mg of the α-pinene, and about 0.8 - 1.6 mg of the α-humulene per dose.

[0012] In some embodiments, the pharmaceutical composition is formulated as a liquid, a pill, a gel capsule, a vaporizable liquid, a vaporizable solid, a transdermal ointment or salve, or a transdermal patch.

[0013] In some embodiments, the pharmaceutical composition is formulated as a liquid. In some embodiments, the liquid comprises citric acid, blue agave, glycerine, one or more lorann oils, food coloring, or a combination thereof.

[0014] In some embodiments, the liquid comprises: about 1% to 7% w/w citric acid; about 40% to 49% w/w blue agave; about 40% to 49% w/w glycerin; about 0.1% to 1.5 % w/w lorann oils; about 0.01 to 0.4% food coloring; or a combination thereof. In some embodiments, the liquid comprises: about 3 - 5% w/w citric acid; about 45 - 49% w/w blue agave; about 45 - 49% w/w glycerin; about 0.7 - 0.9% w/w lorann oils; and about 0.1 - 0.3% food coloring.

[0015] In some embodiments, the pharmaceutical composition is for use in the treatment of opioid addiction.

[0016] In some embodiments, the pharmaceutical composition is for use in the treatment of pain.

[0017] In some embodiments, the pharmaceutical composition is for use in the treatment of chemotherapy-induced nausea and vomiting.

[0018] Also disclosed herein are methods of treating opioid addition, the methods comprising administering an effective amount of a pharmaceutical composition comprising one or more cannabinoids to a subject in need thereof. The pharmaceutical composition can be any pharmaceutical composition disclosed herein.

[0019] In some embodiments, the pharmaceutical composition is administered every 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, or 24 hours.

[0020] In some embodiments, the pharmaceutical composition is administered every 6, 8 or 12 hours.

[0021] In some embodiments, the subjects opioid use decreases by at least 50% within 5 weeks of beginning treatment as determined by morphine equivalency of opioids used.

INCORPORATION BY REFERENCE

[0022] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference. In the event that a term incorporated by reference conflicts with a term defined herein, this specification shall control.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The novel features of the invention are set forth with particularity in the appended claims. A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings of which:

Fig. 1a&b illustrates weekly pill counts in chart form (Fig. 1a) and graph form with regression analysis (Fig 1b).
Fig. 2a&b illustrates weekly pill counts in morphine equivalents in tabular form (Fig. 2a) and graph form with regression analysis (Fig. 2b).

DETAILED DESCRIPTION OF THE INVENTION

[0024] The present disclosure relates to therapeutics, and more especially the use of cannabinoid-based therapeutics, for use in treating those known to have chronic pain. In some cases, the chronic pain may have been treated using opiates. The present disclosure also relates to cannabinoid-based therapeutics for use in treating opioid addiction.

Introduction

[0025] In the United States the estimated total annual cost of pain-related health is approximately $600 billion and perhaps this figure is even higher for the nations in European Union (EU). This estimate includes the actual costs related to the medical care as well as the economic losses which contribute to approximately one-half of these costs. Economic losses include claimed disability, loss of productivity and lost wages. Medical care including physician time, hospitalization, surgical procedures, diagnostic testing and prescription drugs all contribute to the costs associated with the treatment of pain, as well the costs associated with the adverse effects associated with their utilization. Unfortunately, one of the adverse effects associated with prescription painkillers is death. Overdose deaths secondary to prescription opioids were five times higher in 2016 than 1999 and sales of these prescription drugs have quadrupled. That being said, the number of deaths dues to prescription opioids has remained relative stable at approximately 14,000 to 16,000 deaths per year. Much of the increase in mortality related to opioid consumption is due the rapid rise in those associated with the use of synthetic opioids. In states with either medical marijuana or both medical and retail marijuana programs in place there was a 24.8% lower mean annual opioid overdose mortality rate (95%CI, -37.5% to -9.5%: P=.003) compared with states without medical marijuana laws.

[0026] Addressing the opiate crisis in this country has led to a number of studies being conducted using cannabis-based therapy as an alternative means of managing chronic and cancer-related pain. Despite Nabiximols not appearing to be statistically superior when compared to placebo in controlling pain in cancer patients, there are other randomized placebo controlled trials demonstrating the efficacy of using cannabis for pain control. There is also significant evidence that a cannabis-opioid interaction exists that results in improved pain control. All of the studies to date have either used pain scales or patient interview results to determine the success or failure of the cannabis intervention.

[0027] A group of physicians in Nevada, licensed to cultivate, produce and sell cannabis-related products and have recently undertaken a two phase II trials ran using a guava-based syrup with a THC:CBD ratio of 2:1 and at a 1:1 ratio containing only the flavored guava-based syrup. Each dose of syrup contained either 10mg/ml of both delta-9-tetracannabinol (THC) and cannabidiol (CBD) or 20mg of THC and 10mg of CBD. As a proof of concept 25 patients in each group with a history of at least 3 years of chronic opiate use were enrolled in a single arm study with the endpoint being a 30% reduction of opiate intake determined by weekly pill count. 23 of the 25 patients reduced their opiate intake by greater than 50%. This provides an objective basis to evaluate the potential of cannabis to reduce the opiate consumption across the US.

[0028] The claimed beneficial medicinal effects associated with cannabis consumption are quite diverse and of long-standing. In 1889, some of these benefits were first described in the medical literature by Dr. E.A. Birch. Of the claims made, the most studied are in patients with multiple sclerosis, where a beneficial effect on muscle spasticity and pain are well-documented, but not necessarily as consistently as one might like. Cannabis has also been shown to be effective in treating seizures, anorexia, chronic pain, and nausea and vomiting that is associated with chemotherapy. There is

some evidence that cannabidiols have a therapeutic effect of inflammation, chronic pain, diabetes, cancer, and neurodegenerative diseases.

[0029] To understand the underlying basis for the use of cannabinoids in the treatment of chronic pain it is imperative to understand their likely mechanisms of action. Cannabis contains at least 63 cannabinoids but two are best understood studied. The first, delta-9 tetrahydrocannabinol (THC), is responsible for the psychoactive effects that is widely associated with cannabis. The other main active component, cannabidiol (CBD), has no psychoactive effect associated with its consumption but is thought to provide anti-neoplastic, analgesic and antineuroleptic effects per the literature. Even though both cannabinoids are present in every plant, the interactions with the cerebral endocannabinoid receptor system are quite different. CBD binds as an antagonist to the cannabinoid receptor CB1 but the bond between THC and the same receptor is at least 100 times stronger. CBD also antagonizes the action on the cannabinoid G protein-coupled receptor GPR55, which is thought to be responsible the different neuromodulatory actions as the CB1 receptor. Claims of the subjective effects associated with cannabis ingestion include improvement in mood; relaxation; and increased sensitivity. On the other hand THC ingestion has been associated with less than desirable adverse effects such as agitation; panic disorder; depression and even psychosis.

[0030] Cannabinoids have an effect on serotonergic systems, including increasing cerebral production of 5-hydroxytryptamine (5-HT), serotonin while decreasing its uptake at the synapse level. THC has been found to have dopaminergic antagonistic actions which may contribute to its beneficial profile regarding pain control.

[0031] Other phytocannabinoids such as cannabichromene (CBC), cannabigerol (CBG) as well as a number of terpenoids likely contribute its analgesic effect. CBC and CBG have significant anti-inflamatory and analgesic effects over and beyond that associated with THC. B-caryophyllene has been shown to be a selective CB2 agonist and other terpenes such as linalool and a-Pinene have analgesic and anti-inflamatory effects respectively. Myrcene other the other hand has been shown to have analgesic effects mediated through an opioid-like action. This is an important development as it helps explain another avenue as to how cannabis and it component parts may prevent opiate withdrawal and allow for the use of lesser amounts of opioids while preventing the development of tolerance. Used in combination with opioid pain medications, cannabis can lower opioid side effects, cravings, and withdrawal severity, as well as enhance the analgesic effects of opioids, thereby allowing for lower doses and less risk of overdose.

[0032] As explained above the actions of THC, CBD, associated terpenes are potentially complementary and there is substantial evidence to suggest benefit of using together for patients with chronic pain.

Embodiments of the Disclosure

[0033] An embodiment of the present disclosure is the therapeutic compound for the use in treating chronic pain and like disorders and preferably in liquid form compromising a formulation including cannabinoids, but not limited to delta-9- tetrahydrocannabinol and cannabidiol. The compound may optionally include any terpene or terpinoid present in a cannabis plant. A subject suffering from chronic pain is orally administered a therapeutically effective amount of the compound so as to alleviate, cure or prevent the symptoms associated with chronic pain.

[0034] Another embodiment of the present disclosure is the therapeutic compound for the use in treating chronic pain and like disorders and preferably in a pill form compromising a formulation including cannabinoids, but not limited to delta-9-tetrahydrocannabinol and cannabidiol. The compound may optionally include any terpene or terpinoid present in a cannabis plant. A subject suffering from chronic pain is orally administered a therapeutically effective amount of the compound so as to alleviate, cure or prevent the symptoms associated with chronic pain

[0035] Another embodiment of the present disclosure is the therapeutic compound for the use in treating chronic pain and like disorders and preferably in suppository form compromising a formulation including cannabinoids, but not limited to delta-9-tetrahydrocannabinol and cannabidiol. The compound may optionally include any terpene or terpinoid present in a cannabis plant. A subject suffering from chronic pain is orally administered a therapeutically effective amount of the compound so as to alleviate, cure or prevent the symptoms associated with chronic pain

[0036] Another embodiment of the present disclosure is the therapeutic compound for the use in treating chronic pain and like disorders and preferably in capsule form compromising a formulation including cannabinoids, but not limited to delta-9-tetrahydrocannabinol and cannabidiol. The compound may optionally include any terpene or terpinoid present in a cannabis plant. A subject suffering from chronic pain is orally administered a therapeutically effective amount of the compound so as to alleviate, cure or prevent the symptoms associated with chronic pain.

[0037] Another embodiment of the present disclosure is the therapeutic compound for the use in treating chronic pain and like disorders and preferably in a transdermal form compromising a formulation including cannabinoids, but not limited to delta-9-tetrahydrocannabinol and cannabidiol. The compound may optionally include any terpene or terpinoid present in a cannabis plant. A subject suffering from chronic pain is transdermally administered a therapeutically effective amount of the compound so as to alleviate, cure or prevent the symptoms associated with chronic pain.

[0038] Another embodiment of the present disclosure is the therapeutic compound for the use in treating chronic pain and like disorders and preferably in an inhalable/nebulized form compromising a formulation including cannabinoids,

but not limited to delta-9-tetrahydrocannabinol and cannabidiol. The compound may optionally include any terpene or terpinoid present in a cannabis plant. A subject suffering from chronic pain is inhaled in a therapeutically effective amount of the compound so as to alleviate, cure or prevent the symptoms associated with chronic pain

[0039] It shall be noted that the cannabinoid disclosed herein may include any of the identified cannabinoids, but not limited to THC (Tetrahydrocannabinol); THCA (Tetrahydrocannabinolic acid); CBD (Cannabidiol); CBDA (Cannabidiolic Acid); CBN (Cannabinol); CBG (Cannabigerol); CBC (Cannabichromene); CBL (Cannabicyclol); CBV (Cannabivarin); THCV (Tetrahydrocannabivarin); CBDV (Cannabidivarin); CBCV (Cannabichromevarin); CBGV (Cannabigerovarin); CBGM (Cannabigerol Monomethyl Ether); CBE (Cannabielsoin); CBT (Cannabicitran); (OTHC) 10-Oxo-delta-6a-tetrahydrocannabinol; (CBCF) Cannabichromanon; (CBF) Cannabifuran; Cannabiglendol; (CBR) Cannabiripsol; (CBT)Cannbicitran; (DCBF) Dehydrocannabifuran; (cis-THC) Delta-9-cis-tetrahydrocannabinol; (triOH-THC) Tryhydroxy-delta-9-tetrahydrocannabinol; and OH-iso-HHCV.

[0040] It shall also be noted that the terpene disclosed herein may, but is not limited to, any single or combination of the terpenes listed in table 1.

Table 1: List of exemplary terpenes

No.	chemical name	RI (DB1)	formula	MW
1	Fusicocca-3,5-diene	1850	C20H32	272
2	9-epi-Sclarene	1896	C20H32	272
3	Laurenene	1903	C20H32	272
4	Rimuene	1907	C20H32	272
5	Isopimara-8,15-diene	1922	C20H32	272
6	Cembrene	1938	C20H32	272
7	Pimara-8,15-diene	1942	C20H32	272
8	Sclarene	1943	C20H32	272
9	Isohibaene	1944	C20H32	272
10	Rosa-5,15-diene	1945	C20H32	272
11	(E)-2,6-Dimethyl-10-(p-tolyl)-undeca-2,6-diene	1945	C20H30	270
12	Isocembrene	1951	C20H32	272
13	Beyerene	1951	C20H32	272
14	Pimara-8(14),15-diene	1955	C20H32	272
15	Cembrene A	1962	C20H32	272
16	Labda-7,13,14-triene	1978	C20H32	272
17	Isopimara-8(14),15-diene	1981	C20H32	272
18	Isophyllocladene	1982	C20H32	272
19	Dolabella-6,10,15-triene	1984	C20H32	272
20	(Z)-Biformene	1988	C20H32	272
21	Manool oxide	2007	C20H34O	290
22	Geranyllinalool	2008	C20H32	272
23	Isopimara-7,15-diene	2010	C20H32	272
24	15-Kaurene	2011	C20H32	272
25	Isopimara-8,15-diene	2016	C20H32	272
26	Dolabradiene	2017	C20H32	272
27	Trachylobane	2022	C20H32	272
28	(E)-Biformene	2017	C20H32	272

(continued)

No.	chemical name	RI (DB1)	formula	MW
29	Cembrene C	2023	C20H32	272
30	13-epi-Manoyl oxide	2023	C20H34O	290
31	(E)-Labda-7,12,14-triene	2036	C20H32	272
32	Phyllocladene	2042	C20H32	272
33	Abietatriene	2046	C20H30	270
34	16-Atisirene	2051	C20H32	272
35	16-Kaurene	2056	C20H32	272
36	Manool	2070	C20H32	272
37	Aphidicol-15-ene	2073	C20H32	272
38	Valpara-2,15-diene	2073	C20H32	272
39	Abieta-7,13-diene	2084	C20H32	272
40	Labda-7,14-dien-13-ol	2096	C20H34O	290
41	Aphidicol-16-ene	2102	C20H32	272
42	Isoabienol	2124	C20H34O	290
43	Abieta-8(4),13(15)-diene	2152	C20H32	272
44	(8a, t2Z)-Abienol	2146	C20H34O	290
45	Incensole	2193	C20H34O2	306
46	Sclareol	2231	C20H36O2	1308
47	Labda-8(17),14-dien-6,13-diol	2248	C20H34O2	306
48	Incensol acetate	2220	C22H36O3	348
49	Verticilla-4(20),7,11-triene	2040	C20H32	272
50	m-Camphorene	1947	C20H32	272
51	p-Camphorene	1980	C20H32	272
52	Cembrenol	2131	C20H34O	290
53	Stema-13-ene	2025	C20H32	272
54	2-Allyl-4-methylphenol	1262	C10H12O	148
55	8,9-Dehydrothymol acetate	1360	C12H1402	190
56	3,5,5-Trimethyl-4-methylenecyclohex-2-enone	1200	C10H14O	150
57	Cabreuva oxide D	1467	C15H24O	220
58	p-Isopropylbenzaldehyd	1220	C10H12O	148
59	3-Methyl-4-(2,6,6-trimethylcyclohex-2-enyl)-but-3-en-2-one	1471	C14H220	206
60	2,6,6-Trimethyl-3-oxocyclohex-1-ene-1-carbaldehyde	1110	C10H14O2	166
61	Isophorone	1100		
62	3,5,5-Trimethylcyclohex-3-enone	1027	C9H14O	138
63	trans-Sabinyl acetate	1278	C12H16O2	192
64	Nerol	1210	C10H18O	154
65	3a-Hydroxy-1,8-cineol	1217	C10H1802	170
66	Carvone	1214	C10H14O	150

(continued)

No.	chemical name	RI (DB1)	formula	MW
67	Thymol methyl ether	1215	C11H16O	164
68	Pulegone	1215	C10H16O	152
69	Neral	1215	C10H16O	152
70	p-Anisaldehyde	1218	C8H8O2	136
71	Chavicol	1219	C9H10O	134
72	2,3-Dehydro-1,4-cineol	1219	C10H16O	152
73	trans-Isopulegone	1161	C10H16O	152
74	Piperitone	1226	C10H16O	152
75	1,4-Dimethoxy-2-methylbenzene	1226	C9H12O2	152
76	Carvacrol methyl ether	1226	C11H16O	164
77	Isobornyl formate	1228	C11H18O2	182
78	2-Phenylethyl acetate	1230	C10H12O2	164
79	(E)-Cinnamaldehyde	1234	C9H8O	132
80	2,3-Dehydro-1,8-cineol	993	C10H16O	152
81	2-Hydroxypinan-3-one	1235	C10H16O2	168
82	Geraniol	1235	C10H18O	154
83	Pseudodiosphenol	1245	C10H16O2	168
84	cis-Chrysanthenyl acetate	1253	C12H18O2	194
85	trans-Carvone epoxide	1243	C10H14O2	166
86	cis-Sabinene hydrat acetate	1248	C12H20O2	196
87	cis-Ethyl chrysanthemate	1251	C12H20O2	196
88	trans-Sabinen hydrate acetate	1254	C12H20O2	196
89	Citronellyl formate	1259	C11H20O2	184
90	Perilla aldehyde	1260	C10H14O	150
91	trans-Ethyl chrysanthemate	1260	C12H20O2	196
92	trans-Anethol	1262	C10H12O	148
93	Nonanoic acid	1263	C9H18O2	158
94	Isopulegol acetate (Isomer 1)	1263	C12H20O2	196
95	Methyl nerolate	1265	C11H18O2	182
96	Safrol	1265	C10H10O2	162
97	cis-Thiorose oxide	1265	C10H18S	170
98	cis-Verbenyl acetate	1266	C12H18O2	194
99	Thymol	1267	C10H14O	150
100	Bornyl acetate	1270	C12H20O2	196
101	Neomenthyl acetate	1263	C12H22O2	198
102	Deca-2,4-dienal	1270	C10H160	152
103	Isopulegol acetate (Isomer 2)	1271	C12H20O2	196
104	2-Undecanone	1273	C10H16O	152

(continued)

No.	chemical name	RI (DB1)	formula	MW
105	4,8-Dimethylnonanol	1276	C11H24O	172
106	Diosphenol	1276	C10H16O2	168
107	Isobornyl acetate	1276	C12H20O2	196
108	Carvacrol	1278	C10H14O	150
109	Thuj opsadiene	1470	C 15H22	202
110	Sesamol	1280	C7H6O3	138
111	Menthyl acetate	1280	C12H22O2	198
112	Geranial	1244	C10H16O	152
113	Geranyl formate	1284	C11H18O2	182
114	trans-Thiorose oxide	1284	C10H18S	170
115	2-Undecanol	1284	C11H24O	172
116	p-Isopropylbenzyl alcohol	1285	C10H14O	150
117	Sencyunolide	1672	C12H16O2	192
118	trans-Pinocarvyl acetate	1287	C12H18O2	194
119	2,3,6-Trimethylbenzaldehyde	1287	C10H12O	148
120	Terpinen-4-ol acetate	1289	C12H20O2	196
121	Chrysanthenone epoxide	1290	C10H14O2	166
122	(E,E)-Deca-2,4-dienal	1291	C10H16O	152
123	Puleganolide (Isomer 1)	1292	C10H16O2	168
124	Dihydrocarveol acetate (Isomer 2)	1295	C12H20O2	196
125	Isoascaridol	1295	C10H16O2	168
126	Theaspirane (Isomer 1)	1299	C131122O	194
127	cis-Pinocarvyl acetate	1300	C12H18O2	194
128	Dihydronaginata ketone	1300	C10H14O2	166
129	Naginata ketone alcohol	1306	C10H14O3	182
130	Puleganolide (Isomer 2)	1305	C10H16O2	168
131	Methyl geranate	1306	C11H18O2	182
132	Vinylguaiacol	1311	C9H10O2	150
133	5-Acetoxylinalool	1303	C12H20O3	212
134	Theaspirane (Isomer 2)	1313	C13H22O	194
135	Chavicol acetate	1313	C11H12O2	176
136	Myrtenyl acetate	1313	C12H18O2	194
137	Dihydrocarveol acetate (Isomer 2)	1314	C12H20O2	196
138	Apiol	1649	C12H14O4	222
139	trans-Carvyl acetate	1318	C12H18O2	194
140	Thymol acetate	1329	C12H16O2	192
141	Menthothiophene	1330	C10H14S	166
142	2,3,4-Trimethylbenzaldehyde	1331	C10H12O	148

(continued)

No.	chemical name	RI (DB1)	formula	MW
143	Eugenol	1331	C10H12O2	164
144	cis-Dihydrocarvone epoxide	1333	C10H16O2	168
145	Ethyl nerolat	1335	C12H20O2	196
146	Fragranol	1201	C12H20O2	196
147	7,8-Dihydro-b-ionone	1422	C13H22O	194
148	8-Hydroxylinalool	1336	C10141802	170
149	3,4-Dimethoxystyrene	1337	C10H12O2	164
150	Citronellyl acetate	1337	C12H22O2	198
151	trans-8-Mercapto-p-menthan-3-one	1340	C10H18OS	1186
152	Anhydroencecalinol	1640	C14H16O2	216
153	Neryl acetate	1342	C12H20O2	196
154	Dihydrocarveol acetate (Isomer 2)	1342	C12H20O2	196
155	exo-Isocamphanyl acetate	1345	C12H20O2	196
156	cis-Carvyl acetate	1345	C12H18O2	194
157	(Z)-Ethylcinnamate	1344	C11H1202	176
158	Chavibetol (m-Eugenol)	1346	C10H12O2	164
159	4-Methoxyphenyl ethanol	1347	C9H1202	152
160	(E)-Anethol epoxide	1347	C10H12O2	164
161	trans-Dihydrocarvone epoxide	1352	C10H16O2	168
162	endo-Isocamphanyl acetate	1352	C12H20O2	196
163	(E)-Methyl cinnamate	1354	C10H10O2	162
164	cis-8-Mercapto-p-menthan-3-one	1356	C10H18OS	186
165	Dihydrojasmone	1361	C10H14O2	166
166	(E)-b-Damascenone	1363	C13H18O	190
167	3-Allyl-1,4-dimethoxybenzene	1370	C11H14O2	178
168	(Z)-Jasmone	1371	C11H16O	164
169	Isobornyl propionate	1375	C13H22O2	210
170	Ethyl geranate	1377	C12H20O2	196
171	Methyl perillate	1381	C11H16O2	180
172	(Z)-Isoeugenol	1381	C10H12O2	164
173	Osmorhizol	1383	C11H14O2	178
174	2-Dodecanol	1387	C12H26O	186
175	1-Tetradecene	1387	C14H28	196
176	Davanafuran	1394	C14H20O2	220
177	Methyl 4-methoxyphenylacetate	1398	C10H12O3	180
178	(E)-b-Damascone	1398	C13H20O	192
179	trans-Carvyl propionate	1402	C13H20O2	208
180	2,6-Dimethoxycymene	1402	C12H18O2	194

(continued)

No.	chemical name	RI (DB1)	formula	MW
181	Nerylacetone	1412	C13H22O	194
182	2-Hydroxy-1,2-dihydrolavandulyl acetate	1416	C12H22O3	214
183	(Z)-1,2-Dimethoxy-4-propenylbenzene	1419	C11H14O2	178
184	(E)-Cinnamyl acetate	1420	C11H12O2	1176
185	Isobornyl isobutyrate	1424	C14H24O2	224
186	Citronellyl propionate	1427	C13H24O2	212
187	3,4-Dimethoxybenzaldehyde	1428	C9H10O3	166
188	(E)-Isoeugenol	1429	C10H12O2	164
189	cis-Carvyl propionate	1436	C13H20O2	208
190	Massoialactone	1439	C10H16O2	168
191	d-Undecanolide	1565	C11H20O2	184
192	Nordavanone	1451	C11H18O2	182
193	8-Dehydrothymol isobutyrate	1458	C14H18O2	218
194	(E)-1,2-Dimethoxy-4-propenylbenzene	1460	C11H14O2	178
195	Thymol isobutyrate	1462	C14H20O2	220
196	Isobornyl butyrate	1462	C14H24O2	224
197	3,4-Dimethoxybenzyl alcohol	1464	C9H12O3	168
198	Sari sane	1466	C11H12O3	192
199	2-Tridecanone	1477	C13H26O	198
200	2-Tridecanol	1490	C13H28O	200
201	Davana ether	1489	C15H22O2	234
202	a-Campholenyl formate	1240	C1H18O2	182
203	Chavibetyl acetate	1488	C12H14O3	206
204	Homovanilline alcohol	1494	C9H12O3	168
205	Davana ether (Isomer)	1507	C15H22O2	234
206	Isobornyl isovalerate	1516	C15H26O2	238
207	Citronellyl butyrate	1516	C14H26O2	226
208	Elemicine	1522	C12H16O3	208
209	Flavesone	1526	C14H20O4	252
210	allo-Davanone	1539	C15H24O2	236
211	Isodavanone	1545	C15H24O2	236
212	Eupatoriochromene	1726	C13H16O3	220
213	cis-Davanone	1557	C15H24O2	236
214	Geranyl crotonate	1555	C14H22O2	222
215	Diethylphthalate	1555	012111404	222
216	cis-8-Acetylthio-p-menthan-3-one	1559	C12H20O2S	228
217	4-Allyl-2,6-dimethoxyphenol	1561	C11H14O3	194
218	Sandela	1568	C16H28O	236

(continued)

No.	chemical name	RI (DB1)	formula	MW
219	trans-8-Acetylthio-p-mentan-3-one	1570	C12H2002S	228
220	(Z)-Asarone	1584	C12H16O3	208
221	(Z)-3-Hexenyl benzoate	1545	C13H16O2	204
222	Geranyl 2-methylbutyrate	1591	C15H26O2	238
223	1,2-Diacetoxy-4-allylbenzene	1602	C13H14O4	234
224	Leptospermone	1611	C15H22O4	266
225	(Z)-Ethyl p-methoxycinnamate	1614	C12H14O3	206
226	Butylphthalide	1616	C12H14O2	190
227	(E)-Asarone	1636	C12H16O3	208
228	(Z)-Butylidenphthalide	1644	C12H12O2	188
229	6-Methoxythymol isobutyrate	1658	C15H22O3	250
230	2-Pentadecanone	1688	C15H30O	226
231	(E)-Ethyl p-methoxycinnamate	1711	C12H14O3	206
232	(Z)-Ligustilide	1732	C12H14O2	190
233	Heyderiol	2374	C22133004	358
234	(E)-Ligustilide	1782	C12H14O2	190
235	7,11-Dimethylheptadecane	1792	C19H40	268
236	Avocadynofuran	1796	C17H26O	246
237	Galaxolide	1838	C18H26O	258
238	Traseolide	1840	C18H26O	258
239	Tonalide	1850	C18H26O	258
240	1-Nonadecene	1875	C19H38	266
241	Nonadecane	1900	C19H40	268
242	Falcarinol	2028	C17H24O	244
243	Trichocoleine	1875	C14H18O4	250
244	Ambrettolide	1905	C16H28O2	252
245	Methyl 4-Hydroxy-3-methoxy-5-(1,1-dimethylprop-2-enyl)-benzoate	1833	C14H18O4	250
246	(E)-Benzyl cinnamate	2023	C16H14O2	238
247	trans-Pinocarvyl formate	1228	C11H16O2	180
248	Hex-5-en-1-ol	820	C6H12O	100
249	Hex-5-en-3-ol	832	C6H12O	100
250	1-Hexanol	837	C6H14O	102
251	(Z)-Hex-3-en-1-ol	"851	C6H12O	100
252	(E)-Hex-3-en-1-ol	851	C6H12O	100
253	(Z)-Hex-2-en-1-ol	861	C6H12O	100
254	2-Heptanone	871	C7H14O	114
255	2-Heptanol	880	C7H16O	116

(continued)

No.	chemical name	RI (DB1)	formula	MW
256	3-Heptanol	877	C7H16O	116
257	n-Heptanal	882	C7H14O	114
258	Santene	884	C9H14	122
259	2-Methyl-1-hexanol	917	C7H16O	116
260	Tricyclene	927	C10H16	136
"261	a-Pinene	936	C10H16	136
262	Benzaldehyde	941	C7H6O	106
263	a-Fenchene	941	C10H16	136
264	Thuja-2,4(10)-diene	946	C10H14	134
265	6-Methyl-2-heptanol	950	C8H18O	130
266	Camphene	950	C10H16	136
267	1-Octen-3 -ol	962	C8H16O	128
268	3-Octanone	969	C8H16O	128
269	4-Octanol	973	C8H18O	130
270	2-Octanol	981	C8H18O	130
271	3-Octanol	981	C8H18O	130
272	2-Pentylfuran	981	C9H14O	138
273	Yomogialcohol	991	C10H18O	154
274	3,6-Dimethyl-3 -heptanol	990	C9H20O	144
275	D 2-Carene	1000	C10H16	136
276	a-Phellandrene	1002	C10H16	136
277	(Z)-Hex-3-enyl acetate	1002	C8H14O2	142
278	p-Methylanisol	1004	C8H10O	122
279	Benzyl alcohol	1006	C7H8O	108
280	D3-Carene	1010	C10H16	136
281	Phenylacetaldehyde	1012	C8H8O	120
282	m-Cymene	1013	C10H14	134
283	p-Cymene	1015	C10H14	134
284	Salicylaldehyde	1020	C7H6O2	122
285	Limonene	1025	C10H16	136
286	1,8-Cineol	1024	C10H18O	154
287	(Z)-b-Ocimene	1029	C10H16	136
288	(E)-2-Octenal	1034	C8H14O	126
289	5,5-Dimethylbut-3-enolide	916	C6H8O2	112
290	Methyl 3-methylfuroate	1038	C7H8O3	140
291	(E)-b-Ocimene	1041	C10H16	136
292	Oct-3-en-1-ol (Isomer 1)	1044	C8H16O	128
293	Artemisia ketone	1044	C10H16O	152

(continued)

No.	chemical name	RI (DB1)	formula	MW
294	cis-Dihydroroseoxide	1047	C10H20O	156
295	d-Terpineol	1155	C10H16O	152
296	g-Terpinene	1051	C10H16	136
297	trans-Sabinene hydrate	1053	C10H18O	154
298	Dihydromyrcenol	1058	C10H20O	156
299	Non-1-en-3-ol	1058	C9H18O	142
300	trans-Linalooloxide (furanoid)	1058	C10H20O2	172
301	p-Mentha-3,8-diene	1059	C10H16	136
302	Benzyl formate	1060	C8H8O2	136
303	m-Cresol	1061	C7H8O	108
304	p-Cresol	1062	C7H8O	108
305	1-Octanol	1063	C814180	130
306	Fenchone	1069	C10H16O	152
307	o-Guiacol	1072	C7H8O2	124
308	Methyl benzoate	1072	C8H8O2	136
309	cis-Linalool oxide (furanoid)	1072	C10H18O2	170
310	Artemisia alcohol	1073	C10H18O	154
311	Dehydrolinalool	1073	C10H16O	152
312	trans-Dihydroroseoxide	1075	C10H20O	156
313	4-Nonanol	1076	C9H20O	144
314	Terpinolene	1082	C10H16	136
315	cis-Sabinene hydrate	1082	C10H18O	154
316	2-Nonanol	1085	C9H20O	144
317	Linalool	1086	C10H18O	154
318	Photocitral B	1086	C10H16O	152
319	a-Thujone	1089	C10H16O	152
320	2,2',5,6-Tetramethylcyclohexanone (Isomer 1)	1092	C10H18O	154
321	1-Oct-3-enyl acetate	1093	C10H18O2	170
322	4,8-Dimethyl-1,3,7-nonatriene (Isomer 1)	1096	C11H18	150
323	a-Pinene epoxide (Isomer 1)	1096	C10H16O	152
324	a-Fenchol	1099	C10H18O	154
325	cis-Rose oxide	1100	C10H18O	154
326	Isochrysanthenone	1086	C10H14O	150
327	b-Thujone	1103	C10H160	152
328	a-Campholenal	1105	C10H16O	152
329	2,2',5,6-Tetramethylcyclohexanone (Isomer 2)	1106	C10H18O	154
330	2-Methyl-5-propionylfuran	1108	C8H10O2	138
331	cis-p-Menth-2-en-1-ol	1108	C10H18O	154

(continued)

No.	chemical name	RI (DB1)	formula	MW
332	(Z)-Ocimenoxide	1115	C10H16O	152
333	4,8-Dimethylnona-1,3,7-triene (Isomer 2)	1115	C11H18	150
334	a-Pinene epoxide (Isomer 2)	1116	C10H16O	152
335	trans-Rose oxide	1116	C10H18O	154
336	Dihydrolinalool	1118	C10H20O	156
337	Ipsdienol	1123	C10H16O	152
338	Camphor	1123	C10H16O	152
339	trans-p-Menth-2-en-1-ol	1123	C10H18O	154
340	(E)-Ocimenoxide	1125	C10H16O	152
341	p-Mentha-1,5-diene-8-ol	1127	C10H160	152
342	trans-Pinocarveol	1126	C10H16O	152
343	cis-Limonene oxide	1126	C10H16O	152
344	Photocitral A	1127	C10H16O	152
345	o-Cymenene	1076	C10H12	132
346	(E)-Tagetone	1128	C10H16O	152
347	(Z)-Tagetone	1136	C10H16O	152
348	trans-Limonene oxide	1130	C10H16O	152
349	Isopulegol	1132	C10H18O	154
350	1,3-Dimethoxybenzene	1136	C8H10O2	138
351	Menthone	1136	C10H18O	154
352	Pinocarvone	1137	C10H14O	150
353	b-Terpineol	1137	C101418O	154
354	(E)-Non-2-enal	1139	C9H16O	140
355	Isoneral	1140	C10H16O	152
356	cis-b-Terpineol	1141	C10H18O	154
357	Isoborneol	1142	C10H18O	154
358	Karahanaenone	1142	C10H16O	152
359	cis- or trans-Linalool oxide (pyranoid)	1144	C10H18O2	170
360	Isomenthone	1146	C10H18O	154
361	cis-Chrysanthenol	1147	C10H16O	152
362	2-Hydroxyethyl-4-methylbenzene	1147	C9H12O	136
363	4-Isopropylcyclohexanone	1148	C9H16O	140
364	cis- or trans-Linalool oxide (pyranoid)	1148	C10H18O2	170
365	cis-Isopulegone	1148	C10H16O	152
366	Methyl phenylacetate	1148	C9H10O2	150
367	cis-Thujol	1149	C10H18O	154
368	b-Pinene epoxide	1149	C10H16O	152
369	Ethyl benzoate	1150	C9H10O2	150

(continued)

No.	chemical name	RI (DB1)	formula	MW
370	Borneol	1150	C10H18O	154
371	Lavandulol	1150	C10H18O	154
372	Umbellulone	1152	C10H14O	150
373	trans-Chrysanthemol	1153	C10H18O	154
374	Neomenthol	1156	C10H20O	156
375	Viridene	1159	C10H12O	148
376	Isogeranial	1156	C10H16O	152
377	cis-Chrysanthemol	1157	C10H18O	154
378	Benzoic acid	1160	C7H6O2	122
379	3-Thujene-10-al	1158	C10H14O	150
380	Cryptone	1160	C9H14O	138
381	Terpinen-4-ol	1164	C10H18O	154
382	b-Pinene epoxide (Isomer)	1170	C10H16O	152
383	Nona-2,4-dienal	1170	C9H14O	138
384	Methyl salicylate	1171	C8H8O3	152
385	2-Methyl-2-borneol	1175	C11H20O	168
386	2-Allylphenol	1174	C9H10O	134
387	Thujopsa-3-one	1645	C15H24O	220
388	7-Hydroxyhotrienol	1177	C10H18O2	170
389	Myrtenol	1178	C10H16O	152
390	cis-Piperitol	1181	C10H18O	154
391	Safranal	1182	C10H14O	150
392	Estragol (Methylchavicol)	1175	C10H12O	148
393	2-Decanol	1188	C10H22O	158
394	g-Terpineol	1188	C10H18O	154
395	(E,E)-Nona-2,4-dienal	1188	C9H14O	138
396	Methyl a-cyclogeranate	1190	C11H18O2	182
397	trans-Piperitol	1193	C10H18O	154
398	Chrysanthenone	1110	C10H14O	150
399	Fenchyl acetate	1205	C12H20O2	196
400	Benzylacetone	1207	C10H12O	148
401	2-epi-Thujopsa-3-one	1634	C15H24O	220
402	Carvotanacetone	1220	C10H16O	152
403	Menthol	1172	C10H20O	156
404	Isomenthol	1176	C10H20O	156
405	a-Terpinyl acetate	1335	C10H16	136
406	Octyl acetate	1188	C10H20O2	172
407	Dillether	1170	C10H16O	152

(continued)

No.	chemical name	RI (DB1)	formula	MW
408	(E)-Ethyl cinnamate	1439	C11H12O2	176
409	b-Ionone	1468	C13H20O	192
410	Piperonal	1294	C8H6O3	150
411	Vanilline	1355	C8H8O3	152
412	Coumarin	1392	C9H6O2	146
413	(Z)-2-Hexylcinnamic aldehyde	1725	C15H20O	216
414	1-Phenylethyl acetate	1166	C10H12O2	164
415	(Z)-2-Pentylcinnamaldehyde	1632	C14H18O	202
416	Benzyl salicylate	1847	C14H12O3	228
417	Menthofuran	1150	C10H14O	150
418	a-Campholenol	1190	C10H18O	154
419	Methyl jasmonate	1611	C13H20O3	224
420	Isophytol	1949	C20H40O	296
421	Phytol	2114	C20H40O	296
422	(E)-Anyl 2-methylbutyrate	1651	C14H18O2	218
423	(E)-4-Propenylphenol tiglate	1765	C14H16O2	216
424	trans-Epoxypseudoisoeugenyl-2-methylbutyrate	1871	C15H20O4	264
425	(E)-Pseudoisoeugenyl tiglate	1895	C15H18O3	246
426	trans-Epoxypseudoisoeugenol tiglate	1942	C15H18O4	262
427	Dictyotene	1155	C11H18	150
428	Desmarestene	1168	C11H14	146
429	Dictyopterene A	1099	C11H18	150
430	Ectocarpene	1136	C11H16	148
431	(E)-Ectocarpene	1147	C11H16	148
432	cis-Hormosirene	1152	C11H16	148
433	trans-Hormosirene	1160	C11H16	148
434	(Z)-Multifidene	1040	C11H16	148
435	(E)-Multifidene	1047	C11H16	148
436	(E)-Aucantene	1062	C11H16	148
437	(E)-Aucantene	1077	C11H16	148
438	cis-Dihydromultifidene	1052	C11H18	150
439	trans-Dihydromultifidene	1058	C11H18	150
440	Neothujol	1136	C10H16O	152
441	(Z)-Methyl cinnamate	1270	C10H10O2	162
442	Isothuj ol	1121	C10H16O	152
443	Neoisothujol	1132	C10H16O	152
444	Citronellal	1129	C10H18O	154
445	2-Methyl-2-pentanol	944	C6H14O	102

(continued)

No.	chemical name	RI (DB1)	formula	MW
446	6-Acetoxy-p-mentha-1(7),8-diene (Isomer 1)	1312	C12H18O2	194
447	n-Nonanal	1076	C9H18O	142
448	5,7-Dimethylocta-1,6-diene	911	C10H18	138
449	Dec-9-en-1-ol	1240	C10H20O	156
450	Elsholtzia ketone	1175	C10H14O2	166
451	a-Dehydroelsholtzia ketone	1188	C10H12O2	164
452	Dehydroelsholtzia ketone	1277	C10H12O2	164
453	4-Methyl-3-heptanol	956	C8H18O	130
454	6-Methylhept-5-en-2-ol (Sulcatol)	981	C8H16O	128
455	b-Helmiscapene	1446	C15H24	204
456	2,2-Dimethyl-4-oxocyclohexane-1-carbaldehyde	1132	C9H14O2	154
457	Menth-1-en-9-ol	1283	C10H18O	154
458	cis-Dihydrocarvone	1172	C10H16O	152
459	trans-Dihydrocarvone	1177	C10H16O	152
460	Limonen-10-ol	1272	C10H16O	152
461	Tuberolactone	1437	C10H14O2	166
462	trans-Carveol	1200	C10H16O	152
463	Dihydrocarveol (Isomer 1)	1176	C10H18O	154
464	Dihydrocarveol (Isomer 2)	1193	C10H18O	154
465	Dihydrocarveol (Isomer 3)	1205	C10H18O	154
466	cis-Carveol	1210	C10H16O	152
467	4-Methoxyphenylacetone	1343	C10H12O2	164
468	4-Methoxypropiophenone	1415	C10H12O2	164
469	Grandisol	1200	C10H18O	154
470	Hotrienol	1083	C10H16O	152
471	Isopinocampheol	1168	C10H16O	152
472	(E)-Pseudoisoeugenyl-2-methyl butyrate	1823	C15H20O3	248
473	Falcarinone	1990	C17H22O	242
474	Ethyl salicylate	1245	C9H10O3	166
475	1,2-Dihydro-1,1,6-trimethyl-naphthalene	1339	C13H16	172
476	g-Hexanolide	1006	C6H10O2	114
477	g-Heptanolide	1103	C7H12O2	128
478	g-Octanolide	1208	C8H14O2	142
479	g-Nonanolide	1318	C9H16O2	156
480	g-Decanolide	1433	C10H18O2	170
481	g-Undecanolide	1547	C11H20O2	184
482	g-Dodecanolide	1656	C12H22O2	198
483	g-Tetradecanolide	1866	C14H26O2	226

(continued)

No.	chemical name	RI (DB1)	formula	MW
484	d-Nonanolide	1348	C9H16O2	156
485	d-Octanolide	1240	C8H14O2	142
486	d-Heptanolide	1156	C7H12O2	128
487	d-Decanolide	1461	C10H18O2	170
488	(E)-a-Damascone	1375	C13H20O	192
489	4-Methyl-3-heptanone	918	C8H16O	128
490	a-Ionone	1409	C13H20O	192
491	p-Methylacetophenone	1156	C9H10O	134
492	b-Cyclocitral	1195	C10H16O	152
493	cis-a-Irone	1520	C14H22O	206
494	cis-g-Irone	1525	C14H22O	206
495	Dodecanal	1389	C12H24O	184
496	Methyl linolenate	2102	C19H32O2	292
497	Geranyl acetone	1430	C13H220	194
498	trans-Isolimonene	975	C10H16	136
499	cis-Myrtanol	1238	C10H18O	154
500	n-Octanal	981	C8H16O	128
501	p-Menth-1-ene	1017	C15H18	198
502	(E)-Jasmone	1356	C11H16O	164
503	trans-Myrtanol	1240	C10H18O	154
504	allo-Ocimene	1113	C10H16	136
505	(4E,6Z)-allo-Ocimene	1126	C10H16	136
506	Dodecanol	1472	C12H26O	186
507	6-Acetoxy-p-menta-1,8-diene	1341	C12H18O2	194
508	b-Citronellene	943	C15H18	198
509	n-Nonanol	1149	C9H20O	144
510	trans-Sabinol	1120	C10H16O	152
511	3,5-Dimethoxytoluene	1231	C9H12O2	152
512	Phantolide	1712	C17H24O	244
513	Perilla alcohol	1280	C10H16O	152
514	b-Phellandrene	1023	C10H16	136
515	b-Phenylethanol	1085	C8H10O	122
516	Citronellol	1213	C10H20O	156
517	Methyleugenol	1369	C11H14O2	178
518	2-Nonanone	1074	C9H18O	142
519	2-Decanone	1176	C10H20O	156
520	2-Dodecanone	1381	C12H24O	1184
521	4-Isopropylcyclohexanol (Isomer 2)	1130	C9H18O	142

(continued)

No.	chemical name	RI (DB1)	formula	MW
522	Moskachane B	1794	C13H16O3	220
523	Moskachane D	2001	015142003	248
524	cis-Verbenol	1132	C10H16O	152
525	(Z)-Salvene	849	C9H16	124
526	(E)-Salvene	859	C9H16	124
527	Santolinatriene	909	C10H16	136
528	a-Thujene	932	C10H16	136
529	Sabinene	973	C10H16	136
530	a-Terpinene	1013	C10H16	136
531	trans-Verbenol	1136	C10H14O	150
532	Verbone	1183	C10H14O	150
533	Z-Cinnamaldehyde	1185	C9H8O	132
534	3-Phenylpropanol	1201	C9H12O	136
535	(E)-Cinnamyl alcohol	1275	C9H10O	134
536	b-Irone	1566	C14H22O	206
537	Benzyl acetate	1134	C9H10O2	150
538	Indole	1257	C8H7N	117
539	d-Jasmolactone	1450	C10H16O2	168
540	N-Acetyl methyl anthranilate	1565	C10H11O3N	193
541	Benzyl benzoate	1730	C14H12O2	212
542	6-Methylhept-5-en-2-one	978	C8H14O	126
543	Rosefuran	1091	C10H14O	150
544	Rosefuran epoxide	1161	C10H14O2	166
545	b-Pinene	978	C10H16	136
546	Myrcene	987	C10H16	136
547	Oct-3-en-1-ol (Isomer 2)	1049	C8H16O	128
548	6-Acetoxy-p-mentha-1(7),8-diene (Isomer 2)	1343	C12H18O2	194
549	(E)-4-Propenylphenol angelate	1751	C14H16O2	216
550	cis-Epoxypseudoisoeugenyl-2-methyl butyrate	1870	C15H20O4	264
551	Myrtenal	1172	C10H14O	150
552	(E)-Ocimenone	1219	C10H14O	150
553	(Z)-Ocimenone	1209	C10H14O	150
554	Isomenthyl acetate	1298	C12H22O2	198
555	Thymoquinone	1215	C10H12O2	164
556	Cymen-9-ol	1157	C10H14O	150
557	8,9-Dehydrothymol	1190	C10H12O	148
558	(Z)-Methyl p-hydroxycinnamate	1603	C10H10O3	178
559	b-Thujaplicine	1449	C10H12O2	164

(continued)

No.	chemical name	RI (DB1)	formula	MW
560	n-Undecane	1100	C11H24	156
561	n-Nonane	906	C9H20	128
562	Pinocamphone	1139	C10H16O	152
563	Isopinocamphone	1151	C10H16O	152
564	Methyl 2-methylbutyrate	954	C6H12O2	116
565	6-Methylhept-5-enal	985	C8H140	126
566	Furomyrcenol	1256	C10H14O2	166
567	a-Ionone epoxide (Isomer 1)	1516	C13H20O2	208
568	o-Cresol	1037	C7H8O	108
569	(E)-2-Hexenal	832	C6H10O	98
570	Ethyl 2-methylbutyrate	843	C7H14O2	130
571	p-Mentha-2,4(8)-diene	1077	C10H16	136
572	p-Mentha-1,3,8-triene	1101	C10H16	136
573	Neroloxide	1137	C10H16O	152
574	Neoisopulegol	1150	C10H18O	154
575	(E,E)-Nona-3,6-dien-1-ol	1145	C9H16O	140
576	n-Pentylbenzene	1150	C11H16	148
577	(Z)-Ethyl oct-5-enoate	1174	C10H18O2	170
578	a-Terpineol	1176	C10H18O	154
579	2a-Hydroxy-1,8-cineol	1196	C10H18O2	1170
580	cis-Pulegol	1215	01011180	154
581	3b-Hydroxy-1,8-cineol	1229	C10H18O2	170
582	Linalyl acetate	1239	C12H20O2	196
583	Isopiperitenone	1240	C10H14O	150
584	Piperitenone	1318	C10H14O	150
585	Pieritenone oxide	1335	C10H14O2	166
586	Geranyl acetate	1362	C12H20O2	196
587	2-Methylbutyl benzoate	1419	C12H16O2	192
588	Myristicine	1489	C11H12O3	192
589	Acetophenone	1036	C8H8O	120
590	Dihydrotagetone	1047	C10H18O	154
591	p-Cymenene	1075	C10H12	132
592	Piperiton epoxid	1232	C10H16O2	168
593	Nepetalacton (Isomer 2)	1360	C10H14O2	166
594	3,4-Dimethyl-5-pentyl-5H-furan-2-one	1481	C11H18O2	182
595	Methyl p-methoxybenzoate	1338	C9H10O3	166
596	(E)-o-Methoxycinnamyl alcohol	1488	C10H12O2	164
597	(E)-m-Methoxycinnamyl alcohol	1511	C10H12O2	164

(continued)

No.	chemical name	RI (DB1)	formula	MW
598	(E)-p-Methoxycinnamyl alcohol	1523	C10H12O2	164
599	Perillene	1090	C10H14O	150
600	Methyl anthranilate	1308	C8H9O2N	151
601	1-(3-Methoxyphenyl)-2-phenylethane	1735	C15H16O	212
602	1-Phenyl-2-(3,5-dimethoxyphenyl)-ethane	1962	C16H18O2	242
603	1-(3-Methoxyphenyl)-2-(4-methoxyphenyl)-ethane	1988	C16H18O2	242
604	Neryl isobutyrate	1468	C14H24O2	224
605	Zingiberenol	1596	C14H24O	208
606	Encecalin	1813	C14H16O3	232
607	Ethyl p-methoxybenzoate	1415	C10H12O3	180
608	Albanone	1389	C12H18O	178
609	7,10-Anhydro-11,12-dihydrochiloscypholone	1449	C15H24O	220
610	1(11)-Africanen-8-ol	1486	C15H24O	220
611	Atractylone	1497	C15H20O	216
612	Conocephalenol	1497	C15H26O	222
613	Cubebol	1514	C15H26O	222
614	Photosantalol	1511	C15H24O	220
615	Cyperene epoxide	1524	C15H24O	220
616	Isoafricanol	1529	C15H26O	222
617	cis-Cadina-4,6-dien-11-ol	1531	C15H24O	220
618	Elema-1,3-dien-7-ol	1531	C15H24O	220
619	Tamariscol	1535	C15H26O	222
620	Pacifigorgiol	1539	C15H26O	222
621	(E,E)-Methyl 10-oxofamesoate	1896	C16H26O3	266
622	b-Caryophyllene oxide	1546	C15H24O	220
623	Africanone	1547	C15H22O	218
624	1,8-Oxidocadin-4-ene	1551	C15H24O	220
625	4bH,5aH-cis-Eudesm-6-en-11-ol	1555	C15H26O	222
626	Dactylol	1556	C15H26O	222
627	cis-Sesquisabinenhydrate	1558	C15H26O	222
628	11,12-Dihydrochiloscyphone	1558	C15H24O	220
629	Aromadendran-5-ol	1562	C15H26O	222
630	Oxidohimachalene	1557	C15H22O	218
631	(+)-Marsupellol	1564	C15H24O	220
632	b-Himachalol	1638	C15H26O	222
633	Maaliol	1565	C15H26O	222
634	Deoxopinguisone	1563	C15H22O	218
635	Palustrol	1569	C15H26O	222

(continued)

No.	chemical name	RI (DB1)	formula	MW
636	4a-Hydroxygermacra-1(10),5-diene	1571	C151126O	222
637	Spathulenol	1572	C15H24O	220
638	4-Dehydroviridiflorol	1572	C15H24O	220
639	Caryophyllene oxide	1578	C15H24O	220
640	7-Acetoxyelema-1,3,8-triene	1584	C17H26O2	262
641	Globulol	1589	C15H26O	222
642	Cubeban-11-ol	1591	C15H26O	222
643	Salvial-4(14)-en-1-one	1592	C15H24O	220
644	Bisabola-2,10-diene 1,9-oxide	1592	C15H24O	220
645	b-Oplopenone	1595	C15H24O	220
646	Longiborneol	1597	C15H26O	222
647	Rosifoliol	1599	C15H26O	222
648	Ledol	1600	C15H26O	222
649	2-Methyl-1-(octahydro-7,7a-dimethyl-1H-inden-1-yl)-propan-1-one	1601	C15H26O	222
650	Eudesm-4-en-7-ol	1604	C15H260	222
651	Rearrangement product from Grimaldone	1608	C15H22O	218
652	Maalian-5-ol	1607	C15H26O	222
653	10-epi-g-Eudesmol	1609	C15H26O	222
654	ar-Curcumen-7-ol	1610	C15H22O	218
655	Amorpha-4,7-dien-11-ol	1610	C15H24O	220
656	5-Guaiene-11-ol	1619	C15H26O	222
657	g-Eudesmol	1618	C15H26O	222
658	Alismol	1619	C15H24O	220
659	Gymnomitrone	1620	C15H22O	218
660	Isospathulenol	1625	C15H24O	220
661	Isogymnomitrol	1625	C15H24O	220
662	Furanoeudesm-1,3-diene	1630	C15H18O	214
663	Amorpha-4-en-7-ol	1629	C15H26O	222
664	Eudesm-3,11-dien-5-ol	1632	C15H240	220
665	Hinesol	1632	C1511260	222
666	T-Muurolol	1633	C15H26O	222
667	(E,E)-Germacradiene-11-ol	1633	C15H26O	222
668	T-Cadinol	1633	C15H26O	222
669	Gymnomitr-3(15)-en-4-one	1635	C15H22O	218
670	1(10)-Spirovetivene-7b-ol	1636	C15H26O	222
671	Muurola-3,7(11)-dien-1-ol	1637	C15H24O	220
672	6-Himachalen-9b-ol	1638	C15H26O	222

(continued)

No.	chemical name	RI (DB1)	formula	MW
673	Gymnomitran-4-one	1639	C15H24O	220
674	b-Eudesmol	1641	C15H26O	222
675	Furanoeremophilene	1642	C15H220	218
676	2-Himachalen-7b-ol	1642	C15H26O	222
677	a-Cadinol	1643	C15H26O	222
678	Eudesm-4(15)-en-7-ol	1643	C15H24O	220
679	2-Methyl-1-(octahydro-7,7a-dimethyl-1H-inden-1-yl)-propan-1- ol	1645	C15H28O	224
680	Eudesm-11-en-4a-ol	1649	C15H26O	222
681	1(10)-Valencen-7b-ol	1646	C15H26O	222
682	Valerianol	1647	C15H26O	222
683	Eudesm-3-en-7-ol	1650	C15H26O	222
684	10-epi-trans-Dracunculifoliol	1591	C15H26O	222
685	7-epi-a-Eudesmol	1653	C15H26O	222
686	Acorenol B	1654	C15H26O	222
687	Bisabolol oxide B	1654	C15H26O2	238
688	Aromadendran-12-ol	1654	C15H24O	220
689	Grimaldone	1656	C15H22O	218
690	Gymnomitrol	1657	C15H24O	220
691	Eudesm-4(15)-en-6-ol	1656	C15H26O	222
692	Saccogynol	1660	C15H22O	218
693	Valeranone	1664	C15H26O	222
694	4-epi-Acorenone	1664	C15H24O	220
695	Gymnomitr-3(15)-en-4a-ol	1665	C15H24O	220
696	Acorenol	1667	C15H26O	222
697	epi-Cyclosantalal	1668	C15H24O	220
698	(Z)-g-Atlantone	1669	C15H22O	218
699	a-Alasken-6-ol	1674	C15H24O	220
700	Bisabolone oxide A	1675	C15H24O2	236
701	Amorpha-4,7(11)-dien-8-one	1679	C15H22O	218
702	Amorpha-4,9-dien-2-ol	1679	C15H24O	220
703	Amorpha-4,9-dien-14-al	1685	C15H22O	218
704	Eudesm-3-en-6-ol	1679	C15H26O	222
705	Khusiol	1680	C15H26O	222
706	(E)-g-Atlantone	1681	C15H22O	218
707	Acorenone	1681	C15H24O	220
708	Cadina-1(10),4-dien-8a-ol	1682	C15H24O	220
709	Bicyclogermacren-14-al	1684	C15H22O	218
710	Cyperotundone	1684	C15H22O	218

(continued)

No.	chemical name	RI (DB1)	formula	MW
711	(Z)-a-Atlantone	1689	C15H22O	218
712	Lanceol oxide	1695	C15H24O	220
713	Farnesol (Isomer 1)	1694	C15H26O	222
714	6a-Hydroxygermacra-1(10),4-diene	1687	C15H26O	222
715	Acora-7(11),9-dien-2-one	1706	C15H22O	218
716	Valerenal	1706	C15H22O	218
717	a-Herbertenol	1711	C15H22O	218
718	Dihydrochiloscypholone	1711	C15H26O2	238
719	Italicen-4-one	1717	C15H22O	218
720	Farnesol (Isomer 2)	1718	C15H26O	222
721	10-epi-1,8-Oxidocadina-4-ene	1539	C15H24O	220
722	Neopetasone	1733	C15H22O	218
723	7,14-Anhydroamorpha-4,9-diene	1733	C15H22O	218
724	Lepidozenal	1744	C15H22O	218
725	7-Acetoxyelema-1,3-dien-8-ol	1793	C17H28O3	280
726	Naviculol	1734	C15H26O	222
727	Bisabolol oxide A	1740	C15H26O2	238
728	a-Cyperone	1741	C15H22O	218
729	Cyclocolorenone	1745	C15H22O	218
730	Gymnomitrol acetate	1751	C17H26O2	262
731	b-Herbertenol	1751	C15H22O	218
732	(E)-a-Atlantone	1754	C15H22O	218
733	(Z)-Lanceol	1755	C15H24O	220
734	Cuparophenol	1763	C15H220	218
735	Cedryl acetate	1764	C17H28O2	264
736	14-Oxocalamenene	1768	C15H20O	216
737	Isovalencenol	1779	C15H24O	220
738	Drimenol	1750	C15H26O	222
739	cis-5-Hydroxycalamenene	1790	C15H22O	218
740	Khusienol acetate	1789	C17H26O2	262
741	Fukinanolide	1798	C15H22O2	234
742	Bisabola-2,7(Z),10(Z)-triene-13-ol	1806	C15H24O	220
743	Cyperadione	1820	C15H24O2	236
744	cis-Spiroether	1850	C13H12O2	200
745	trans-Spiroether	1853	C13H12O2	200
746	trans-4,8a-Dimethyl-4a,5-epoxydecaline	1350	C12H20O	180
747	Peculiaroxide	1416	C15H26O	222
748	Furanoelemene	1485	C15H20O	216

(continued)

No.	chemical name	RI (DB1)	formula	MW
749	Guaioxide	1487	C15H26O	222
750	Elemol	1541	C15H26O	222
751	Lemnalol	1579	C15H24O	220
752	Fokienol	1582	C15H24O	220
753	Thujopsane-2b-ol	1593	C15H26O	222
754	a-Alasken-8-ol	1600	C15H24O	220
755	6-epi-Cubenol	1602	C15H26O	222
756	Widdrol	1601	C15H26O	222
757	Marsupellone	1604	C15H22O	218
758	Axinyssene	1860	C20H32	272
759	Selina-1,3,7(11)-trien-8-one	1616	C15H20O	216
760	Myliol	1617	C15H22O	218
761	a-Acorenol	1623	C15H26O	222
762	Furanogermacrene	1624	C15H20O	216
763	Acora-3,7(11)-dien-6-ol	1626	C15H24O	220
764	b-Acorenol	1626	C15H26O	222
765	a-Alaskene-8-ol	1632	C15H24O	220
766	Microbiotol	1632	C15H26O	222
767	Isopinguisanine	1638	C15H20O2	232
768	Gymnomitr-3(15)-en-4b-ol	1653	C15H24O	220
769	a-Eudesmol	1653	C15H26O	222
770	Isorotundenol	1659	C15H26O	222
771	Bulnesol	1665	C15H26O	222
772	Bicyclohumulenone	1668	C15H24O	220
773	Selina-4(15),11-dien-8-ol	1670	C15H24O	220
774	Smymicordifuran	1673	C15H18O2	230
775	b-Sinensal	1675	C15H22O	218
776	Isocyperol	1676	C15H24O	220
777	a-Cuparenone	1681	C15H20O	216
778	Cyperol	1681	C15H24O	220
779	Gymnomitr-3-en-15-ol	1688	C15H24O	220
780	Pinguisanine	1706	C15H20O2	232
781	Acora-3,7(11)-dien-8-one	1709	C15H22O	218
782	Vetiselinol	1709	C15H24O	220
783	10,11-Dihydro-a-cuparenone	1712	C15H22O	218
784	Oxidoselina-1,3,7(11)-trien-8-one	1725	C15H20O2	232
785	a-Sinensal	1726	C15H22O	218
786	Plagiochilide	1729	C15H20O2	232

(continued)

No.	chemical name	RI (DB1)	formula	MW
787	(E,E)-Methyl 10,11-epoxyfamesoate	1875	C16H26O3	266
788	Eudesma-3,11-dien-2-one	1776	C15H22O	218
789	Zizaenic acid	1791	C15H22O2	234
790	Acutifolene B	1806	C15H20O3	248
791	a-Vetivone	1821	C15H22O	218
792	(E,E)-Farnesylacetate	1822	C17H28O2	264
793	Acutifolene A	1833	C16H22O3	262
794	Furanoeremophilone	1855	C15H20O2	232
795	2-Acetoxyfuranoelemene	1876	C17H22O3	274
796	Guaia-3,10(14)-dien-6,12-olide	1938	C15H20O2	232
797	olide	1950	C15H18O2	230
798	1b-Acetoxyfurano-4(15)-eudesmene	1964	C17H22O3	274
799	1b-Acetoxyfurano-3-eudesmene	1978	C17H22O3	274
800	Maalioxide	1508	C15H26O	222
801	Kessane	1533	C15H26O	222
802	Humulene epoxide 3	1626	C15H24O	220
803	8-Hydroxybicyclogermacrene	1661	C15H24O	220
804	Lactarovioline	2068	C15H14O	210
805	5-epi-Pinguisenol	1764	C15H26O	222
806	b-Santalol acetate	1800	C17H26O2	262
807	Bisacumol (Isomer 1)	1596	C15H22O	218
808	Bisacumol (Isomer 2)	1619	C15H22O	218
809	Bisabola-1,3(15),10-trien-9-ol (Isomer 1)	1666	C15H24O	220
810	Bisabola-1,3(15),10-trien-9-ol (Isomer 2)	1678	C15H24O	220
811	trans-Sesquisabinen hydrate	1564	C15H26O	222
812	1bH-Presilphiperfolane-9a-ol	1510	C15H26O	222
813	1aH-Presilphiperfolan-9b-ol	1499	C15H26O	222
814	Presilphiperfolane-9a-ol	1519	C15H26O	222
815	ar-Curcumen-15-al	1681	C15H20O	216
816	Sesquicineol	1507	C15H26O	222
817	Italicen-13-al	1671	C15H22O	218
818	a-Copaen-8-ol	1551	C15H24O	220
819	Khusimol	1720	C15H24O	220
820	Zizanol	1656	C15H24O	220
821	Oxidocadalene	1644	C15H18O	214
822	Eremoligenol	1614	C15H26O	222
823	Isohumbertiol D (Isomer 2)	1519	C15H24O	220
824	Isohumbertiol D (Isomer 1)	1490	C15H24O	220

(continued)

No.	chemical name	RI (DB1)	formula	MW
825	Brachylaenalone B	1824	C15H20O2	232
826	Khusien-12-al	1580	C15H22O	218
827	Eudesma-4(15),7(11)-dien-8-one	1713	C15H22O	218
828	Elemenone	1589	C15H22O	218
829	b-Cedrene epoxide	1610	C15H24O	220
830	b-Panasinsen-5a-ol	1621	C15H24O	220
831	Budesm-7(11)-en-4a-ol	1676	C15H26O	222
832	5,8-Cyclocaryophyllan-4-ol	1514	C15H26O	222
833	Khusol	1769	C15H24O	220
834	cis-10-Hydroxycalamenene	1643	C15H22O	218
835	trans-10-Hydroxycalamenene	1635	C15H22O	218
836	Bryopterine A	1735	C16H20O3	260
837	Isoitalicene epoxide	1501	C15H24O	220
838	Italicene epoxide	1535	C15H24O	220
839	a-Agarofuran	1537	C15H24O	220
840	Longipin-3-en-10-ol	1560	C15H24O	220
841	Dihydrosesquicineol	1467	C15H28O	224
842	Dehydrosesquicineol	1466	C15H24O	220
843	Longicamphenilone	1549	C14H22O	206
844	Longicamphenilol	1578	C14H24O	208
845	Isobutyl angelate	1027	C9H16O2	156
846	Isoacorone	1774	C15H24O2	236
847	Dehydrosesquicineyl-12-ol	1707	C15H24O2	236
848	Dihydrobryopterine A	1763	C16H22O3	262
849	(E)-Nuciferal	1705	C15H20O	216
850	(Z)-Nuciferal	1695	C15H20O	216
851	Pinguisanene	1544	C15H20O	216
852	(E)-Methyl 10-hydroxy-3,7,11-trimethyldodeca-2,6,11-trienoate	1930	C16H26O3	266
853	Dihydroagarofuran	1500	C15H26O	222
854	Isolongifolol	1717	C15H26O	222
855	(Z)-Nerolidol	1522	C15H26O	222
856	(E)-Nerolidol	1553	C15H26O	222
857	a-Cedrene oxide	1571	C15H24O	220
858	Caryolan-1-ol	1567	C15H26O	222
859	Thujopsan-2a-ol	1584	C15H26O	222
860	Curcerenone	1588	C15H18O2	230
861	a-Guaiol	1593	C15H26O	222
862	Viridiflorol	1592	C15H26O	222

(continued)

No.	chemical name	RI (DB1)	formula	MW
863	Epicurcerenone	1593	C15H18O2	230
864	Carotol	1594	C15H26O	222
865	Cedrol	1603	C15H26O	222
866	12-epi-Cedrol	1620	C15H26O	222
867	1-epi-Cubenol	1623	C15H26O	222
868	ar-Turmerone	1643	C15H20O	216
869	3(15)-Cedren-4-ol	1647	C15H24O	220
870	a-Turmerone	1649	C15H22O	218
871	Patchouli alcohol	1661	C15H26O	222
872	(Z)-a-Santalol	1669	C14H22O	206
873	a-Bisabolol	1673	C15H26O	222
874	Acorenone B	1679	C15H24O	220
875	Germacrone	1684	C15H22O	218
876	Curcuphenol	1693	C15H22O	218
877	2-Butylfuran	869	C8H12O	124
878	Pinguisone	1705	C15H20O2	232
879	(Z)-b-Santalol	1702	C15H24O	220
880	Xanthorhizol	1732	C15H22O	218
881	cis-2-Hydroxycalamenene	1762	C15H22O	218
882	Furanogermenone	1770	C15H20O2	232
883	Alantolactone	1873	C15H20O2	232
884	Dihydroisoalantolactone	1875	C15H22O2	234
885	Frullanolide	1900	C15H20O2	232
886	Isoalantolactone	1912	C15H20O2	232
887	ent-Diplophyllolide	1937	C15H20O2	232
888	Guaia-6,9-dien-4b-ol	1565	C15H24O	220
889	Guaia-6,10(14)-diene-4b-ol	1610	C15H24O	220
890	Cedrenone	1722	C15H22O	218
891	8bH-Cedran-9-one	1608	C15H24O	220
892	Deodarone	1676	C15H24O2	236
893	Pogostol	1647	C15H26O	222
894	Dihydro-ar-turmerone	1570	C15H22O	218
895	Norpatchoulenol	1551	C14H22O	206
896	Caryophyllan-2,6-a-oxide	1412	C1511260	222
897	Caryophyllen-2,6-b-oxide	1422	C15H26O	222
898	b-Atlantol (Isomer 1)	1436	C15H24O	220
899	b-Atlantol (Isomer 2)	1443	C15H24O	220
900	1,11-Oxidocalam enene	1474	C15H20O	216

(continued)

No.	chemical name	RI (DB1)	formula	MW
901	Furopelargone A	1517	C15H22O2	234
902	Isohumbertiol B	1522	C15H24O	220
903	Silphiperfolene-5-ol	1549	C15H24O	220
904	b-Funebrene epoxide	1591	C15H24O	220
905	b-Himachalene epoxide	1594	C15H24O	220
906	Copabomeol	1595	C15H26O	222
907	10-epi-Italicen-4-one	1615	C15H22O	218
908	ar-Bisabolol	1619	C15H22O	218
909	allo-Aromadendrene epoxide	1623	C15H24O	220
910	Amorph-4-en-10a-ol	1634	0151426O	222
911	allo-Himachalol	1648	C15H26O	222
912	Farnesal (Isomer 1)	1655	C15H24O	220
913	b-Sesquiphellandrone	1677	C15H22O	218
914	Aromadendran-14-ol	1679	C15H26O	222
915	Farnesal (Isomer 2)	1683	C15H24O	220
916	Farnesal (Isomer 3)	1707	C15H24O	220
917	Longifolol	1707	C15H26O	222
918	Sesquichamaenol	1744	C15H22O2	234
919	(E,E)-Methyl farnesoate	1765	C16H26O2	250
920	trans-2-Hydroxycalamenene	1753	C15H22O	218
921	a-Santalol acetate	1756	C17H26O2	262
922	8-Acetoxyelemol	1759	C17H26O2	262
923	Nootkatone	1782	C15H22O	218
924	Striatol	1550	C15H26O	222
925	Eremophila-1(10),11-dien-9b-ol	1552	C15H24O	220
926	Longipinanol	1559	C15H26O	222
927	Brachyl oxide	1599	C15H24O	220
928	Humulene epoxide 2	1602	C15H24O	220
929	Copaen-15-ol	1661	C15H24O	220
930	Isonaviculol	1743	C15H26O	222
931	Cyperenal	1741	C15H22O	218
932	g-Curcumen-15-al	1744	C15H22O	218
933	Brachylaenalone A	1802	C15H20O2	232
934	Muurola-4,10(14)-dien-8a-ol	1594	C15H24O	220
935	Cadma-1(10),4-dien-8a-ol	1637	C15H24O	220
936	Hexyl acetate	1006	C8H16O2	144
937	Muurola-4,10(14)-dien-8b-ol	1675	C15H24O	220
938	(Z)-Nuciferol	1695	C15H22O	218

(continued)

No.	chemical name	RI (DB1)	formula	MW
939	(Z)-g-Curcumen-12-ol	1701	C15H24O	220
940	(E)-Nuciferol	1715	C15H22O	218
941	(Z)-g-Curcumyl acetate	1767	C17H26O2	262
942	(Z)-Nuciferyl acetate	1793	C17H24O2	260
943	(Z)-Nuciferyl isobutyrate	1916	C19H28O2	288
944	(Z)-g-Curcumenyl isobutyrate	1920	C19H30O2	290
945	(Z)-Nuciferyl 2-methylbutyrate	2003	C20H30O2	302
946	(Z)-g-Curcumyl 2-methylbutyrate	2011	C20H32O2	304
947	Drim-8-en-7-one	1778	C15H24O	220
948	1-Oxo-a-longipinene	1639	C15H22O	218
949	g-Bicyclohomofamesal	1784	C16H26O	234
950	Geosmin	1392	C12H22O	182
951	Muurol-4-en-6a-ol	1609	C15H26O	222
952	Veticadine oxide	1482	C15H24O	220
953	Cubenol	1630	C15H26O	222
954	4-epi-Cubebol	1490	C15H26O	222
955	Muurol-4-en-3,8-dione	1753	C15H22O2	234
956	3-Acetoxyamorpha-4,7(11)-dien-8-one	1950	C17H24O3	276
957	(E)-4,8-Dimethylnona-1,3,7-triene	1103	C11H18	150
958	Geijerene	1139	C12H18	162
959	Albene	1154	C12H18	162
960	Trinoranastreptene	1197	C12H16	160
961	1,4a-Dimethyl-1,2,3,4,4a,5,6,7-octahydro-naphthalene	1233	C12H20	164
962	Pregeijerene	1288	C12H18	162
963	(Z)-2,6,10-Trimethylundeca-2,6-diene	1305	C14H26	194
964	Isocyclobazzanene	1319	C15H24	204
965	8,9-Didehydrocycloisolongifolene	1320	C15H22	202
966	(E)-2,6,10-Trimethylundeca-2,6-diene	1321	C14H26	194
967	Cyprotene	1322	C14H24	192
968	Presilphiperfol-1-ene	1325	C15H24	204
969	7aH-Silphiperfol-5-ene	1329	C15H24	204
970	Brasila-5,10-diene	1335	C15H24	204
971	Bicycloax-4(15)-ene	1336	C15H24	204
972	Bicycloelemene	1338	C15H24	204
973	d-Elemene	1340	C15H24	204
974	3,10-Dihydro-1,4-dimethylazulene	1342	C12H14	158
975	Presilphiperfol-7-ene	1342	C15H24	204
976	Pentalenene	1343	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
977	African-5-ene	1350	C15H24	204
978	African-2(6)-ene	1350	C15H24	204
979	Maali-1,3-diene	1347	C15H22	202
980	Silphin-1-ene	1350	C15H24	204
981	7bH-Silphiperfol-5-ene	1352	C15H24	204
982	a-Cubebene	1355	C15H24	204
983	Tamariscene	1355	C15H24	204
984	Africa-1,5-diene	1355	C15H22	202
985	African-1-ene	1356	C15H24	204
986	Bicycloax-3-ene	1357	C15H24	204
987	Silphiperfola-5,7(14)-diene	1360	C15H22	202
988	a-Longipinene	1360	C15H24	204
989	Clovene	1365	C15H24	204
990	Cyperadiene	1365	C15H22	202
991	Cyclomyltaylane	1366	C15H24	204
992	1-epi-a-Pinguisene	1367	C15H24	204
993	Brasila-5(10),6-diene	1370	C15H24	204
994	Anastreptene	1373	C15H22	202
995	Capnell-9(12)-ene	1372	C15H24	204
996	a-Ylangene	1376	C15H24	204
997	Isopatchoula-3,5-diene	1377	C15H22	202
998	Cyclosativene	1378	C15H24	204
999	Hirsutene	1378	C15H24	204
1000	a-Copaene	1379	C15H24	204
1001	a-Bourbonene		C15H24	204
1002	Daucene	1380	C15H24	204
1003	Silphiperfol-6-ene	1378	C15H24	204
1004	Bourbon-7-ene	1381	C15H24	204
1005	a-Elemene	1381	C15H24	204
1006	Isodauca-4,7(14)-diene	1381	C15H24	204
1007	Isoledene	1382	C15H24	204
1008	Protoillud-6-ene	1382	C15H24	204
1009	Longicyclene	1382	C15H24	204
1010	Modhephene	1383	C15H24	204
1011	Pacifigorgia-1(9),10-diene	1384	C15H24	204
1012	3-epi-African-5-ene	1384	C15H24	204
1013	10-epi-Italicene	1384	C15H24	204
1014	Asterisca-3(15),6-diene	1385	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1015	a-Funebrene	1385	C15H24	204
1016	b-Panasinsene	1385	C15H24	204
1017	Bicycloopposit-4-ene	1386	C15H24	204
1018	b-Bourbonene	1386	C15H24	204
1019	Isodauca-4,6-diene	1385	C15H24	204
1020	African-2-ene	1387	C15H24	204
1021	7-epi-Sesquithujene	1387	C15H24	204
1022	b-Patchoulene	1388	C15H24	204
1023	a-Duprezianene	1388	C15H24	204
1024	b-Elemene	1389	C15H24	204
1025	a-Isocomene	1389	C15H24	204
1026	1,5-di-epi-a-Bourbonene	1389	C15H24	204
1027	b-Cubebene	1390	C15H24	204
1028	1,5-di-epi-b-Bourbonene	1390	C15H24	204
1029	African-3-ene	1391	C15H24	204
1030	Bicyclo-4(15)-oppositene	1391	C15H24	204
1031	Isolongifolene	1393	C15H24	204
1032	Isodauca-6,9-diene	1393	C15H24	204
1033	Sativene	1394	C15H24	204
1034	Pacifigorgia-1,10-diene	1400	C15H24	204
1035	Petasitene	1398	C15H24	204
1036	Sesquithujene	1399	C15H24	204
1037	African-3(15)-ene	1400	C15H24	204
1038	Cyperene	1402	C15H24	204
1039	b-Longipinene	1403	C15H24	204
1040	7-epi-a-Cedrene	1404	C15H24	204
1041	Helifolene	1406	C15H24	204
1042	7-epi-Helifolene	1406	C15H24	204
1043	Italicene	1408	C15H24	204
1044	Isocaryophyllene	1409	C15H24	204
1045	b-Isocomene	1411	C15H24	204
1046	Longifolene	1411	C15H24	204
1047	Ylanga-2,4(15)-diene	1411	C15H22	202
1048	cis-a-Bergamotene	1411	C15H24	204
1049	allo-Isolongifolene	1412	C15H24	204
1050	Cycloseychellene	1413	C15H24	204
1051	a-Gurjunene	1413	C15H24	204
1052	a-Barbatene	1414	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1053	b-Funebrene	1418	C15H24	204
1054	b-Maaliene	1414	C15H24	204
1055	Pacifigorgia-1(6),10-diene	1414	C15H24	204
1056	Cascarilladiene	1416	C15H24	204
1057	Isosativene	1416	C15H24	204
1058	Tritomarene	1416	C15H24	204
1059	a-Microbiotene	1414	C15H24	204
1060	Aristolene	1423	C15H24	204
1061	a-Cedrene	1418	C15H24	204
1062	Pacifigorgia-2,10-diene	1422	C15H24	204
1063	b-Ylangene	1420	C15H24	204
1064	(Z)-b-Farnesene	1420	C15H24	204
1065	Acora-3,5-diene	1421	C15H24	204
1066	(E)-b-Caryophyllene	1421	C15H24	204
1067	a-Santalene	1422	C15H24	204
1068	Spirovetiva-1(10),6-diene	1422	C15H24	204
1069	b-Duprezianene	1423	C15H24	204
1070	Opposita-4(15),7-diene	1423	C15H24	204
1071	b-Cedrene	1424	C15H24	204
1072	Opposita-4(15),11-diene	1424	C15H24	204
1073	Selina-3,6-diene	1424	C15H24	204
1074	Bourbon-11-ene	1424	C15H24	204
1075	Dauca-3,8-diene	1428	C15H24	204
1076	Elema-1,3,7(11),8-tetraene	1428	C15H22	202
1077	g-Elemene	1429	C15H24	204
1078	Isobarbatene	1428	C15H24	204
1079	g-Maaliene	1428	C15H24	204
1080	Aristola-1(10),8-diene	1429	C15H22	202
1081	Chenopodene	1430	C15H24	204
1082	b-Copaene	1430	C15H24	204
1083	Thujopsene	1434	C15H24	204
1084	Selina-4(15),5-diene	1433	C15H24	204
1085	Pacifigorgia-2(10),11-diene	1435	C15H24	204
1086	trans-a-Bergamotene	1434	C15H24	204
1087	a-Pinguisene	1436	C15H24	204
1088	b-Sesquifenchene	1437	C15H24	204
1089	Sesquisabinene A	1435	C15H24	204
1090	Calarene	1437	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1091	Cubeb-11-ene	1445	C15H24	204
1092	b-Gorgonene	1440	C15H24	204
1093	a-Maalinene	1440	C15H24	204
1094	Cyclofarnesa-5(14),8,10-triene	1441	C15H24	204
1095	a-Guaiene	1440	C15H24	204
1096	Acora-3,9-diene	1442	C15H24	204
1097	Aromadendrene	1443	C15H24	204
1098	Brasila-1(6),5(10)-diene	1442	C15H24	204
1099	Isobazzanene	1442	C15H24	204
1100	Guaia-6,9-diene	1443	C15H24	204
1101	Nardosina-7,9,11-triene	1444	C15H22	202
1102	4aH,10aH-Guaia-1(5),6-diene	1445	C15H24	204
1103	Isogermacrene D	1445	C15H24	204
1104	Selina-5,11-diene	1444	C15H24	204
1105	Eremophila-1(10),6-diene	1445	C15H24	204
1106	b-Barbatene	1445	C15H24	204
1107	Cadina-4,11-diene	1458	C15H24	204
1108	Erythrodi ene	1446	C15H24	204
1109	epi-b-Santalene	1446	C15H24	204
1110	Sesquisabinene B	1446	C15H24	204
1111	Seychellene	1447	C15H24	204
1112	Cadina-3,5-diene	1448	C15H24	204
1113	(E)-b-Farnesene	1446	C15H24	204
1114	4bH,10aH-Guaia-1(5),6-diene	1448	C15H24	204
1115	Selina-4(15),6-diene	1450	C15H24	204
1116	a-Himachalene	1450	C15H24	204
1117	Prezizaene	1452	C15H24	204
1118	Bourbon-7(11)-ene	1454	C15H24	204
1119	a-Humulene	1455	C15H24	204
1120	e-Muurolene	1455	C15H24	204
1121	a-Panasinsene	1455	C15H24	204
1122	Zizaene	1456	C15H24	204
1123	a-Neoclovene	1456	C15H24	204
1124	Valerena-4,7(11)-diene	1456	C15H24	204
1125	Acora-3,10(14)-diene	1457	C15H24	204
1126	Selina-4(15),7-diene	1457	C15H24	204
1127	b-Spathulene	1457	C15H22	202
1128	Muurola-4,11-diene	1458	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1129	Selina-2,4-diene	1462	C15H24	204
1130	(Z,Z)-a-Farnesene	1460	C15H24	204
1131	b-Santalene	1460	C15H24	204
1132	7bH,10bH-Cadina-1(6),4-diene	1460	C15H24	204
1133	Rotundene	1461	C15H24	204
1134	Selina-3,7-diene	1460	C15H24	204
1135	Striatene	1458	C15H24	204
1136	allo-Aromadendrene	1462	C15H24	204
1137	Aromadendr-9-ene	1463	C15H24	204
1138	a-Patchoulene	1467	C15H24	204
1139	a-Acoradiene	1464	C15H24	204
1140	Carota-5,8-diene	1465	C15H24	204
1141	b-Acoradiene	1465	C15H24	204
1142	4,5-di-epi-Aristolochene	1470	C15H24	204
1143	Selina-4,7-diene	1469	C15H24	204
1144	2-epi-(E)-b-Caryophyllene	1467	C15H24	204
1145	g-Muurolene	1474	C15H24	204
1146	Amorpha-4,11-diene	1472	C15H24	204
1147	7aH,10bH-Cadina-1(6),4-diene	1472	C15H24	204
1148	ar-Curcumene	1473	C15H22	202
1149	Eudesma-1,4(15),11-triene	1472	C15H22	202
1150	Eudesma-2,4,11-triene	1471	C15H22	202
1151	g-Gurjunene	1472	C15H24	204
1152	Ishwarane	1468	C15H24	204
1153	Valenca-2,9,11-triene	1473	C15H22	202
1154	b-Chamigrene	1474	C15H24	204
1155	(3E,6Z)-a-Farnesene	1475	C15H24	204
1156	Selina-4,11-di ene	1475	C15H24	204
1157	b-Microbiotene	1473	C15H24	204
1158	a-Amorphene	1477	C15H24	204
1159	g-Curcumene	1475	C15H24	204
1160	Herbertene	1476	C15H22	202
1161	Zierene	1476	C15H22	202
1162	a-Neocallitropsene	1475	C15H24	204
1163	Amorpha-4,7(11)-diene	1476	C15H24	204
1164	5-epi-Aristolochene	1477	C15H24	204
1165	Isobicyclogermacrene	1477	C15H24	204
1166	b-Neoclovene	1475	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1167	trans-b-Bergamotene	1480	C15H24	204
1168	g-Himachalene	1479	C15H24	204
1169	Laurene	1483	C15H20	200
1170	Germacrene D	1479	C15H24	204
1171	(3Z,6E)-a-Farnesene	1480	C15H24	204
1172	a-Vetispirene	1481	C15H22	202
1173	e-Cadinene	1483	C15H24	204
1174	g-Humulene	1483	C15H24	204
1175	Isolepidozene	1483	C15H24	204
1176	cis-Eudesma-6,11-diene	1484	C15H24	204
1177	Nardosina-9,11-diene	1484	C15H24	204
1178	Nardosina-1(10),11-diene	1484	C15H24	204
1179	Eudesma-3,5,11-triene	1485	C15H22	202
1180	Aristolochene	1486	C15H24	204
1181	Eremophilene	1486	C15H24	204
1182	d-Selinene	1490	C15H24	204
1183	·b-Vetispirene	1486	C15H22	202
1184	Bicyclosesquiphellandrene	1487	C15H24	204
1185	b-Selinene	1486	C15H24	204
1186	g-Amorphene	1492	C15H24	204
1187	allo-Aromadendr-9-ene	1489	C15H24	204
1188	Eremophila-1(10),7-diene	1488	C15H24	204
1189	Selina-3,5-diene	1486	C15H24	204
1190	Zingiberene	1489	C15H24	204
1191	b-Alaskene	1495	C15H24	204
1192	Ledene	1491	C15H24	204
1193	Drim-8(12)-ene	1497	C15H26	206
1194	Valencene	1494	C15H24	204
1195	epi-Zonarene	1494	C15H24	204
1196	(Z)-a-Bisabolene	1494	C15H24	204
1197	a-Selinene	1494	C15H24	204
1198	Bicyclogermacrene	1494	C15H24	204
1199	Caparratriene	1493	C15H26	206
1200	Eudesma-2,4(15),11-triene	1495	C15H22	202
1201	Hinesene	1495	C15H24	204
1202	a-Muurolene	1496	C15H24	204
1203	Aciphyllene	1495	C15H24	204
1204	a-Cuprenene	1497	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1205	Cuparene	1498	C15H22	202
1206	g-Patchoulene	1497	C15H24	204
1207	e-Amorphene	1498	C15H24	204
1208	g-Guaiene	1499	C15H24	204
1209	b-Pinguisene	1500	C15H24	204
1210	d-Amorphene	1499	C15H24	204
1211	(E,E)-a-Farnesene	1498	C15H24	204
1212	1aH,10aH-Guaia-4,6-diene	1500	C15H24	204
1213	b-Himachalene	1500	C15H24	204
1214	D7(14)-ar-Himachalene	1501	C15H20	200
1215	b-Bisabolene	1503	C15H24	204
1216	a-Chamigrene	1503	C15H24	204
1217	Eremophila-1((10),8,11-triene	1504	C15H22	202
1218	Germacrene A	1503	C15H24	204
1219	Isorotundene	1503	C15H24	204
1220	a-Bulnesene	1503	C15H24	204
1221	b-Curcumene	1503	C15H24	204
1222	Drimenene	1503	C15H24	204
1223	Pseudowiddrene	1503	C15H24	204
1224	a-Alaskene	1512	C15H24	204
1225	(Z)-g-Bisabolene	1505	C15H24	204
1226	g-Cadinene	1507	C15H24	204
1227	Nootkatene	1512	C15H22	202
1228	Cyclobazzanene	1514	C15H24	204
1229	cis-Calamenene	1517	C15H22	202
1230	b-Sesquiphellandrene	1516	C15H24	204
1231	D7,8-ar-Himachalene	1518	C15H20	200
1232	7-epi-a-Selinene	1519	C15H24	204
1233	b-Bazzanene	1519	C15H24	204
1234	d-Cadinene	1520	C15H24	204
1235	(E)-g-Bisabolene	1521	C15H24	204
1236	trans-Calamenene	1517	C15H22	202
1237	Zonarene	1521	C15H24	204
1238	b-Cadinene	1526	C15H24	204
1239	g-Cuprenene	1523	C15H24	204
1240	Spirovetiva-1(10),7(11)-diene	1523	C15H24	204
1241	g-Vetivenene	1525	C15H22	202
1242	Cadina-1,4-diene	1523	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1243	w-Cadinene	1526	C15H24	204
1244	a-Calacorene	1527	C15H20	200
1245	Eremophila-1(10),7(11)-diene	1527	C15H24	204
1246	ar-Himachalene	1528	C15H22	202
1247	(E)-a-Bisabolene	1530	C15H24	204
1248	5-epi-Laurene	1531	C15H20	200
1249	1,4-Dimethylazulene	1532	C12H12	156
1250	Selina-4(15),7(11)-diene	1534	C15H24	204
1251	a-Cadinene	1534	C15H24	204
1252	w-Amorphene	1540	C15H24	204
1253	d-Cuprenene	1546	C15H24	204
1254	(1(10)E,4Z)-Germacrene B	1543	C15H24	204
1255	Selina-3,7(11)-diene	1542	C15H24	204
1256	Germacrene B	1552	C15H24	204
1257	b-Vetivenene	1552	C15H22	202
1258	g-Calacorene	1554	C15H20	200
1259	(3E,7E)-4,8,12-Trimethyltrideca-1,3,7,11-tetraene	1565	C16H26	218
1260	Cadalene	1659	C15H18	198
1261	Daucalene	1671	C15H18	198
1262	Chamazulene	1719	C14H16	184
1263	Guaiazulene	1761	C15H18	198
1264	6-epi-b-Cubebene	1449	C15H24	204
1265	e-Cuprenene	1524	C15H24	204
1266	Gymnomitra-3(15),4-diene	1413	C15H22	202
1267	Tenuifolene	1570	C15H22	202
1268	ar-Tenuifolene	1528	C15H20	200
1269	trans-Eudesma-3,5-diene	1490	C15H24	204
1270	Pethybrene	1440	C15H24	204
1271	Premnaspirodiene	1516	C15H24	204
1272	Spirolepechinene	1450	C15H24	204
1273	trans-Dauca-4(11),7-diene	1554	C15H24	204
1274	trans-Dauca-4(11),8-diene	1529	C15H24	204
1275	Cadina-1(10),3,7(11)-triene	1575	C15H22	202
1276	7,8-Dehydro-a-acoradiene	1450	C15H22	202
1277	cis-Muurola-4(15),5-diene	1462	C15H24	204
1278	Patchoula-2,4(15)-diene	1434	C15H22	202
1279	Norrotundene	1421	C14H22	190
1280	cis-b-Guaiene	1488	C15H24	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1281	Bisabola-1,3,5,11-tetraene	1461	C15H24	204
1282	4-epi-b-Patchoulene	1376	C15H24	204
1283	d-Patchoulene	1466	C15H24	204
1284	e-Patchoulene	1473	C15H24	204
1285	10-epi-Muurola-4,11-diene	1458	C15H24	204
1286	Dauca-8,11-diene	1431	C15H24	204
1287	Neotrifaradiene	1365	C15H24	204
1288	Sandvicene	1399	C15H24	204
1289	Trifara-9,14-diene	1403	C15H24	204
1290	cis-Muurola-3,5-diene	1447	C15H24	204
1291	Pacifigorgia-6, 10-diene	1429	C15H24	204
1292	b-Bulnesene	1558	C15H24	204
1293	Isocalamenene	1527	C15H22	202
1294	Myltayl-4(12)-ene	1452	C15H24	204
1295	3,7-di-epi-Trifara-9,14-diene	1399	C15H24	204
1296	6-epi-a-Cubebene	1418	C15H24	204
1297	2-Sterpurene	1351	C15H24	204
1298	a-Corocalen	1602	C15H20	200
1299	Lactarazulene	1796	C15H16	196
1300	Prenyllimonene (Isomer 1)	1436	C15H24	204
1301	Prenyllimonene (Isomer 2)	1450	C15H24	204
1302	Cadina-1(10),7(11)-diene	1538	C15H24	204
1303	Elema-1,3,7-triene	1346	C15H24	204
1304	7-epi-Cadina-1(10),11-diene	1525	C15H24	204
1305	Cadina-1(10),11-diene	1480	C15H24	204
1306	Vetivazulene	1790	C15H18	198
1307	Mintsulphide	1734	C15H24S	236
1308	Brasila-1,10-diene	1307	C15H24	204
1309	Drim-8-ene	1442	C15H26	206
1310	Selina-4(15),7,11-triene	1469	C15H22	202
1311	5,6-Dehydroalaskene	1371	C15H22	202
1312	(all-Z)-6,9,12,15-Heneicosatetraene	2048	C21H36	288
1313	Isoperillene	1073	C10H14O	150
1314	(E)-Cinnamyl isovalerate	1641	C14H18O2	218
1315	(E)-Cinnamyl isobutyrate	1543	C13H16O2	204
1316	(E)-Cinnamyl propionate	1500	C12H14O2	190
1317	(Z)-Isobutyl cinnamate	1593	C13H16O2	204
1318	Phenylethyl tiglate	1547	C13H16O2	204

(continued)

No.	chemical name	RI (DB1)	formula	MW
1319	7-epi-Eremophila-1(10),8,11-triene	1508	C15H22	202
1320	5-Hydroxymarsupellyl acetate	1814	C17H26O3	278
1321	Marsupellyl acetate	1681	C17H26O2	262
1322	4-epi-Marsupellyl acetate	1733	017142602	262
1323	(E)-Methyl p-methoxycinnamate	1625	C11H1203	192
1324	(Z)-Methyl p-methoxycinnamate	1543	C11H12O3	192
1325	4-epi-Marsupellol	1614	C15H24O	220
1326	(Z)-Cinnamyl propionate	1552	C12H14O2	190
1327	(E)-Isobutyl cinnamate	1633	C13H16O2	204
1328	Methyl 4-methoxymandelate	1511	C10H12O4	196
1329	(E)-Isoamyl cinnamate	1697	C14H18O2	218
1330	Pentadecanoic acid	1823	C15H30O2	242
1331	Methyl o-methoxybenzoate	1300	C9H10O3	166
1332	Patchenol	1305	C11H180	166
1333	Syringa aldehyde	1599	C9H10O4	182
1334	Methyl 3-methylorsellinate	1674	C10H12O4	196
1335	Dihydroactinidiolide	1487	C11H16O2	180
1336	b-Ionone epoxide	1460	C13H20O2	208
1337	Oxoisophorone	1111	C9H12O2	152
1338	Sabina ketone	1132	C9H14O	138
1339	2,6-Di-tert-butyl-4-methylphenol	1492	C15H24O	220
1340	Cadin-1(10)-ene 5,11-oxide	1574	C15H24O	220
1341	6,11-Epoxyisodaucane	1463	C15H26O	222
1342	3-Acetoxy-b-ionone	1752	C15H22O3	250
1343	Nardosina-7,9-dien-11-ol	1596	C15H24O	220
1344	Porosadienol	1627	C151124O	220
1345	a-Ionone epoxide (Isomer 2)	1512	C13H20O2	208
1346	Cabreuva oxide A	1437	C15H24O	220
1347	Cabreuva oxide B	1452	C151124O	220
1348	Cabreuva oxide C	1456	C15H24O	220
1349	(E)-o-Methoxycinnamaldehyde	1477	C1OH10O2	162
1350	(Z)-o-Methoxycinnamaldehyde	1408	C10H10O2	162
1351	Hydrocinnamyl acetate	1336	C11H14O2	178
1352	N-Methyl methyl anthranilate	1372	C9H11O2N	165
1353	Abietal	2261	C20H30O	286
1354	trans-Totarol	2241	C20H30O	286
1355	Dehydrogeosmin	1362	C12H20O	180
1356	1bH,5aH,7bH-Guaia-3,10(14)-dien-11-ol	1646	C15H24O	220

(continued)

No.	chemical name	RI (DB1)	formula	MW
1357	9a,11-Epoxy-1bH,5aH,7bH,9bH-guaia-3,10(14)-diene	1587	C15H22O	218
1358	4-(4-Hydroxyphenyl)-2-butanone	1508	C10H12O2	164
1359	15-Norlabdan-8-ol	1943	C19H36O	280
1360	Oxoisoambrox	1819	C16H26O2	250
1361	Sclareolide	2022	C16H24O3	264
1362	1-Decanol	1264	C10H22O	158
1363	Amberone	1810	C17H26O	246
1364	Methyl arachidonate	2217	C21H34O2	318
1365	Cyclomyltayl an-15-ol	1641	C15H24O	220
1366	Tridenson	1633	C15H26O	222
1367	Tridensenal	1617	C15H26O	222
1368	6b-Acetoxyeudesm-4(15)-en-7b-ol	1898	C18H3002	278
1369	Tridensenone	1815	C15H20O	216
1370	2,6,6-Trimethylcyclohexanone	1023	C9H16O	140
1371	2,6,6-Trimethylcyclohex-2-enone	1045	C9H14O	138
1372	Acetoxycedren-13-ol	1782	C17H26O2	262
1373	4-Isopropylcyclohexanol (Isomer 1)	1126	C9H18O	142
1374	3-Hydroxy-4-methoxybenzyl alcohol	1421	C8H1003	154
1375	a-Ambrinol (Isomer 1)	1382	C13H22O	194
1376	a-Ambrinol (Isomer 2)	1410	C13H22O	194
1377	Thymohydroquinone	1509	C10H14O2	166
1378	Oreodaphnenol	1484	C15H24O	220
1379	Ambrox	1747	C16H28O	236
1380	4-Isopropylphenol	1201	C9H12O	136
1381	Scopoletine	1888	C10H8O4	192
1382	2,5-Dimethoxy-4-isopropyltoluene	1400	C12H18O2	194
1383	Silphiperfol-5-en-3-one	1533	C15H22O	218
1384	Clovenol	1575	C15H24O	220
1385	trans-6-Hydroxyisocalamenene	1782	C15H22O	218
1386	1,4-trans-6-Methoxyisocalamenene	1722	C16H24O	232
1387	Non-1-ene	837	C9H18	126
1388	Mintoxide	1565	C15H24O	220
1389	6-Methylheptan-2,4-dione	975	C8H1402	142
1390	5-Methylheptan-2,4-dione	966	C8H14O2	142
1391	2,2-Dimethyl-7-isobutyl-2H,5H-pyrano[4.3-b]pyran-5-one	1770	C14H18O3	234
1392	2,2-Dimethyl-7-secbutyl-2H,5H-pyrano[4.3-b]pyran-5-one	1764	C14H18O3	234
1393	Cyclo-b-ionone	1329	C13H20O	
1394	Germacra-4(15),5,10(14)-tnen-1a-ol	1680	C15H24O	220

(continued)

No.	chemical name	RI (DB1)	formula	MW
1395	Eudesma-4(15),7-dien-1b-ol	1671	C15H24O	220
1396	Cadina-4,10(14)-dien-1a-ol	1662	C15H24O	220
1397	b-Calacorene	1541	C15H2O	200
1398	1a,10a-Epoxyamorph-4-ene	1569	C15H24O	220
1399	Muurola-4,10(14)-dien-1-ol	1626	C15H24O	220
1400	Caryophylla-3 (15),7(14)-dien-6-ol	1635	C15H24O	220
1401	4(15)-Dehydroglobulol	1597	C15H24O	220
1402	trans-Bisabola-1(6),10-dien-2,3-diol	1758	C15H26O2	238
1403	6,10-Epoxybisabol-2-en-12-al	1664	C15H24O2	236
1404	6,10-Epoxybisabol-3-en-12-al	1677	C15H24O2	236
1405	11-epi-6,10-Epoxybisabol-3-en-12-al	1649	C15H24O2	236
1406	Acora-3,5-dien-11-ol	1574	C15H24O	220
1407	Acora-2,4(15)-dien-11-ol	1616	C15H24O	220
1408	7-epi-Bisabol-1-one	1718	C15H24O	220
1409	(E)-trans-a-Bergamota-2,10-dien-12-al	1679	C15H22O	218
1410	Helifolen-12-al (syn-syn-syn)	1611	C16H24O	232
1411	Italicene ether	1531	C1SH24O	220
1412	7-epi-b-Bisabolol	1657	C15H26O	222
1413	Bisabol-1-one	1712	C15H24O	220
1414	Humulene epoxide 1	1593	C14H22O	206
1415	10-epi-Italicene ether	1511	C15H24O	220
1416	3-Hydroxybisabola-1(6),10-dien one	1748	C15H24O2	236
1417	b-Bisabolol	1659	C15H26O	222
1418	10-epi-Junenol	1581	C15H26O	222
1419	Junenol	1617	C15H26O	222
1420	1,10-di-epi-Cubenol	1615	C15H26O	222
1421	Carquejyl acetate	1284	C12H16O2	192
1422	(E)-Dendrolasin	1566	C15H22O	218
1423	Artemisyl acetate	1164	C12H20O2	196
1424	Artedouglasia oxide C	1507	C15H22O3	250
1425	Artedouglasia oxide A	1517	C15H22O3	250
1426	1-Undecanol	1363	C11H24O	172
1427	Laciniata furanone H	1530	C15H22O3	250
1428	Lanciniata furanone F	1514	C15H22O3	250
1429	Artedouglasia oxide B	1561	C15H22O3	250
1430	Artedouglasia oxide D	1542	C15H22O3	250
1431	Cymen-8-ol	1169	C10H14O	150
1432	2,2,9-Trimethyl-1,6-dioxaspiro[4.4]nona-3,8-diene	1079	C10H14O2	166

(continued)

No.	chemical name	RI (DB1)	formula	MW
1433	Menthyl formate	1230	C11H20O2	184
1434	Folifolone	1090	C10H14O	150
1435	Santolina alcohol	1029	C10H18O	154
1436	cis-p-Mentha-1(7),8-dien-2-ol	1217	C10H16O	152
1437	trans-p-Mentha-1(7),8-dien-2-ol	1176	C10H16O	152
1438	trans-p-Menth-2-en-1-ol	1116	C10H18O	154
1439	cis-p-Mentha-2,8-dien-1-ol	1125	C10H16O	152
1440	trans-p-Mentha-2,8-dien-1-ol	1113	C10H16O	152
1441	Dehydrosabinaketone	1100	C9H12O	136
1442	4-Hydroxy-4-methylcyclohex-2-enone	1089	C7H10O2	126
1443	2-(1-Hydroxyethyl)-5-methyl-5-vinyltetrahydrofuran	1054	C9H16O2	156
1444	trans-Arbusculone	1036	C9H1402	154
1445	Lavender lactone	1006	C7H10O2	126
1446	Pulegone epoxide	1238	C10H16O2	168
1447	3-Methylcyclohexanone	928	C7H12O	112
1448	trans-Linalool oxide acetate	1274	C12H20O3	1212
1449	Fragranyl acetate	1331	C11H18O2	182
1450	6-Methyl-6-(3-methylphenyl)-2-heptanone	1609	C15H22O	218
1451	3-exo-Acetoxybornyl acetate	1520	C14H22O4	254
1452	3-exo-Acetoxyborneol	1402	C12H20O3	212
1453	3-exo-Hydroxybornyl acetate	1393	C12H20O3	212
1454	Lavandulyl acetate	1275	C12H20O2	196
1455	5-Hydroxymarsupellol	1776	C15H24O2	236
1456	b-Isolongibomene	1440	C15H24	204
1457	Geranyl propionate	1486	C13H22O2	210
1458	(E)-Isosafrol	1356	C10H10O2	162
1459	2,3-Dihydrofamesol	1674	C15H28O	224
1460	Methyl 4-hydroxymandelate	1572	C9H10O4	182
1461	Methyl 3-(4-methoxyphenyl)-propionate	1494	C11H14O3	194
1462	Methyl 3,5-dimethoxyphenylacetate	1603	C11H14O4	210
1463	2a-Hydroxyamorpha-4,7(11)-diene	1678	C15H24O	220
1464	1-Hepten-3-one	956	C7H120	112
1465	Ferulyl angelate	1682	C15H20O3	248
1466	Undecanal	1290	C11H22O	170
1467	n-Hexadecanoic acid	1951	C16H32O2	256
1468	n-Tetradecanoic acid	1748	C14H28O2	228
1469	n-Dodecanoic acid	1554	C12H24O2	200
1470	n-Decanal	1180	C10H20O	156

(continued)

No.	chemical name	RI (DB1)	formula	MW
1471	Axenol (Gleenol)	574	C15H26O	222
1472	epi-Methyl jasmonate	1637	C13H20O3	224
1473	5-Ethylcyclopent-1-enecarbaldehyde	1010	C8H120	124
1474	Methyl hexanoate	905	C7H14O2	130
1475	Methyl undecanoate	1400	C12H24O2	200
1476	Methyl dodecanoate	1500	C13H26O2	214
1477	Methyl tridecanoate	1600	C14H28O2	228
1478	Methyl myristoleate	1683	C1H28O2	240
1479	(Z)-Methyl pentadec-10-enoate	1786	C16H30O2	254
1480	Methyl palmitoleate	1877	C17H32O2	268
1481	(Z)-Methyl Heptadec-10-enoate	1978	C18H34O2	282
1482	Methyl heptadecanoate	2001	C17H34O2	270
1483	Methyl oleate	2082	C19H36O2	296
1484	Dihydroedulan	1290	C13H22O	194
1485	2-Methylbenzofuran	1149	C9H8O	132
1486	(all-Z)-Methyl Docosa-4,7,10,13,16,19-hexaenoate	2395	C23H34O2	342
1487	(Z,Z)-Methyl docosa-13,16-dienoate	2433	C23H42O2	350
1488	Methyl erucate	2440	C23H44O2	352
1489	Methyl behenate	2459	C23H46O2	354
1490	Methyl tricosanoate	2558	C24H48O2	368
1491	Methyl nervonate	2650	C25H48O2	380
1492	(Z)-Methyl eicosa-11-enoate	2248	C21H40O2	324
1493	Methyl lignocerate	2695	C25H50O2	382
1494	Methyl arachidate	2306	C21H42O2	326
1495	Methyl heneicosanoate (C-21)	2412	C22H44O2	340
1496	Methyl stearate	2104	C19H38O2	298
1497	(all-Z)-Methyl eicosa-11,14-dienoate	2243	C22H40O2	336
1498	Methyl elaidate	2084	C19H36O2	296
1499	Methyl linolenate	2036	C19H32O2	292
1500	Methyl linoleate	2046	C19H34O2	294
1501	Methyl palmitate	1901	C17H34O2	270
1502	Methyl pentadecanoate	1796	C16H32O2	256
1503	Methyl myristate	1700	C15H30O2	242
1504	Methyl octanoate	1100	C9H18O2	172
1505	Methyl nonanoate	1208	C10H20O2	186
1506	Methyl decanoate	1300	C11H22O2	186
1507	(3Z,9E)-Isoligustilide	1824	C12H14O2	190
1508	(Z)-3-Butyliden-4,5,6,7-tetrahydrophthalide	1697	C12H16O2	192

(continued)

No.	chemical name	RI (DB1)	formula	MW
1509	Neophytadiene (Isomer 1)	1807	C20H38	278
1510	Neophytadiene (Isomer 2)	1830	C20H38	278
1511	Neophytadiene (Isomer 3)	1849	C20H38	278
1512	Eudesm-3-ene 6,7-oxide	1787	C15H24O	220
1513	Eudesma-3,7(11)-dien-8-one	1745	C15H22O	218
1514	5-Methylfurfural	941	C6H6O2	110
1515	g-Costol	1732	C15H24O	220
1516	a-Costol	1761	C15H24O	220
1517	b-Costol	1754	C15H24O	220
1518	Dehydrocostunolide	1956	C15H18O2	230
1519	Dihydrodehydrocostus lactone	1903	C15H20O2	232
1520	Eudesma-4(15),11-dien-8-one	1643	C15H22O	218
1521	(E)-15,16-Bisnorlabda-8(17),12-dien-14-al	2051	C18H28O	260
1522	(E)-15,16-Bisnorlabda-8(17),11-dien-13-one	1958	C18H28O	260
1523	Albicanol	1736	C16H28O	236
1524	g-Bicyclofamesal	1656	C15H24O	220
1525	trans-6,6,10-Trimethyl-2-decalone	1505	C13H22O	194
1526	Coronarin E	"2095	C20H280	284
1527	10-Hydroxy-4-oplopanone	1708	C15H26O2	238
1528	Valerenic acid	1843	C15H22O2	234
1529	Vulgarone A	1580	C15H22O	218
1530	Artemisiatriene	923	C10H16	136
1531	2-Methylbutyl octanoate	1427	C13H26O2	214
1532	Hexyl hexanoate	1363	C12H24O2	200
1533	(E)-2-Decenal	1240	C10H18O	154
1534	2-methylbutyl hexanoate	1235	C11H22O2	186
1535	n-Hexyl 2-methylbutanoate	1220	C11H22O2	186
1536	n-Hexyl butanoate	1176	C1OH20O02	172
1537	(E)-2-Heptenal	942	C7H12O	112
1538	Fenchyl acetate (Isomer)	1224	C12H20O2	196
1539	11-Nordrim-8-en-12-al	1609	C14H22O	206
1540	Undecanoic acid	1452	C11H22O2	186
1541	Allyl-2,4-di-acetoxybenzene	1592	C13H14O4	234
1542	n-Decane	993	C10H22	142
1543	n-Dodecane	1200	C12H26	170
1544	n-Tridecane	1300	C13H28	184
1545	n-Tetradecane	1392	C14H30	198
1546	n-Pentadecane	1500	C15H32	212

(continued)

No.	chemical name	RI (DB1)	formula	MW
1547	n-Hexadecane	1600	C16H34	226
1548	n-Heptadecane	1700	C17H36	240
1549	n-Octadecane	1792	C18H38	254
1550	n-Eicosane (C-20)	2000	C20H42	282
1551	n-Heneicosane (C-21)	2100	C21H44	296
1552	n-Docosane (C-22)	2200	C22H46	310
1553	n-Tricosane (C-23)	2301	C23H48	324
1554	n-Tetracosane (C-24)	2400	C24H50	338
1555	n-Pentacosane (C-25)	2498	C25H52	352
1556	n-Hexacosane (C-26)	"2598	C26H54	366
1557	Verbenene	982	C10H14	134
1558	trans-Chrysanthenyl acetate	1214	C12H18O2	194
1559	trans-Chrysanthenol	1096	C10H16O	152
1560	(Z)-2,6-Dimethylocta-1,5,7-trien-3-ol	1048	C10H16O	152
1561	(E)-2,6-Dimethylocta-1,5,7-trien-3-ol	1058	C10H16O	152
1562	Dihydrodiplophylline	1896	C15H22O2	234
1563	Diplophylline	1965	C15H20O2	232
1564	Ginsensene	1353	C15H24	204
1565	2-Methyl-2,5-divinyltetrahydrofuran	900	C9H14O	138
1566	5-Ethyl-2-methyl-2-vinyltetrahydrofuran	893	C9H16O	140
1567	(all-E)-1,7 -Dimethylcyclodeca-1,4,7-triene	1274	C12H18	162
1568	Salviadienol	1545	C15H24O	220
1569	Torilenol	1599	C13H20O	192
1570	Betaer-13-ene	2040	C20H32	272
1571	Ethylbenzene	843	C8H10	106
1572	4-epi-11-Noraristola-9,11-diene	1399	C14H20	188
1573	4-epi-11-Noraristola-1,9,11-triene	1419	C14H18	186
1574	4-epi-11-Noraristola-1(10),11-diene	1409	C14H20	188
1575	4-Ethylguiacol	1257	C9H12O2	152
1576	2-Hydroxy-4-methoxyacetophenone	1294	C9H1003	166
1577	4-Vinylanisol	1134	C9H10O	134
1578	p-Ethylanisol	1099	C9H12O	136
1579	1-Acetoxy-4-ethylbenzene	1238	C10H12O2	164
1580	Tetradecanal	1596	C14H28O	212
1581	4-Ethylphenol	1139	C8H10O	122
1582	Dehydropinguisenol	1800	C15H20O2	232
1583	Fusicocca-2,5-diene	2020	C20H32	272
1584	Crispatanolide	1760	C15H22O2	234

(continued)

No.	chemical name	RI (DB1)	formula	MW
1585	(+)-Himachala-2,4-diene	1433	C15H24	204
1586	Polygodial	1839	C15H22O2	234
1587	9-epi-Polygodial	1960	C15H22O2	234
1588	Dihydrofrullanolide	1874	C15H22O2	234
1589	Eudesma-3,11-dien-8-one	1666	C15H22O	218
1590	5,8a-Dimethyl-3,4,4a,7,8,8a-hexahydro-1H-naphthalen-2-one	1464	C12H18O	178
1591	8a-Hydroxyeudesma-3,11-diene	1668	C15H24O	220
1592	6,11-Epoxyeudesmane	1521	C15H26O	222
1593	Eudesma-5,7(11)-diene	1543	C15H24	204
1594	6b-Hydroxyeudesm-11-ene	1643	C15H26O	222
1595	6a-Hydroxyeudesm-11-ene	1598	C15H26O	222
1596	6,7-seco-Eudesm-7(11)-en-6-al	1615	C15H26O	222
1597	Ipsenol	1083	C10H18O	154
1598	Phytane	1808	C20H42	282
1599	Farnesane	1375	C15H32	212
1600	b-n-Octyl-g-butanolide	1655	C12H22O2	198
1601	Crocetane	1810	C20H42	282
1602	Pristane	1706	C19H40	268
1603	cis-Eudesma-4,11-dien-8-ol	1648	C15H24O	220
1604	Bisabola-1(6),2,10Z-trien-12-al	1733	C15H22O	218
1605	8,9-Epoxyselina-4,11-diene	1597	C15H22O	218
1606	Eudesma-4(15),11-dien-5-ol	1629	C15H24O	220
1607	cis-Eudesma-4(15),11-dien-5-ol	1623	C15H24O	220
1608	Pentadecanal	1702	C15H30O	226
1609	3-Methylbutanolide	909	C5H8O2	100
1610	2-n-Propyl-g-butanolide	1100	C7H12O2	128
1611	2-n-Pentyl-g-butanolide	1311	C9H16O2	156
1612	2-Ethylbutanolide	1000	C6H10O2	114
1613	2-Methylbutanolide	902	C5H8O2	100
1614	4-Allyl-g-butanolide	1090	C7H10O2	126
1615	d-Tetradecalactone	1893	C14H26O2	226
1616	d-Tridecanolide	1786	C13H24O2	212
1617	d-Dodecanolide	1675	C12H22O2	198
1618	g-n-Tetradecyl-g-butanolide	2720	C18H34O2	282
1619	d-Hexaolide	1044	C6H10O2	114
1620	N-2-[(4-Hydroxyphenyl)-ethyl]-tiglamide	2325	C13H17O2N	219
1621	4-Hydroxy-b-ionone	1628	C13H20O2	208
1622	(E)-Megastigm-7-en-3,9-dione (t)	1572	C13H20O2	208

(continued)

No.	chemical name	RI (DB1)	formula	MW
1623	a-Helmiscapene	1447	C15H24	204
1624	Methyl 2-(2-methylbutyroxy)-3-methylpentanoate	1339	C12H22O4	230
1625	7,8-Dihydro-b-ionol	1431	C13H24O	196
1626	Dodecyl acetate	1585	C14H28O2	228
1627	(Z)-Heptadec-8-ene	1666	C17H34	238
1628	cis-Dracunculifolione	1500	C15H24O	220
1629	Italicen-13-ol	1670	C15H24O	220
1630	10-epi-cis-Dracunculifoliol	1533	C15H26O	222
1631	cis-Dracunculifoliol	1534	C15H26O	222
1632	trans-Dracunculifoliol	1581	C15H26O	222
1633	3-Hydroxy-b-ionone	1647	C13H20O2	208
1634	3-Hydroxy-5,6-dihydro-b-ionone	1609	C13H22O2	210
1635	(E)-b-Santalol	1680	C15H24O	220
1636	o-Cymene	976	CI0H14	134
1637	Methyl 11-methyltridecanoate	1668	C15H30O2	242
1638	Libocedrol	2326	C22H30O4	358
1639	Aristol-1(10)-en-12-ol	1712	C15H24O	220
1640	Costunolide	1914	C15H20O2	232
1641	7-Hydroxyeudesm-4-en-6-one	1703	C15H24O2	236
1642	Aristol-1(10)-en-12-al	1704	C15H22O	218
1643	Methyl 10-methyldodecanoate	1575	C14H28O2	228
1644	Dotriacontane	3200	C32H66	450
1645	Eudesma-4(15),7(11),9-trien-12-olide	1971	C15H18O2	230
1646	Isogermafurenolide	1867	C15H20O2	232
1647	Chloranthalactone A	1941	C15H16O2	228
1648	Ethyl decanoate	1375	C12H24O2	200
1649	Ethyl palmitate	1954	C18H36O2	284
1650	7,11-Epoxymegastigm-5-en-9-one	1551	C13H20O2	208
1651	Neoiso-isopulegol	1164	C10H18O	154
1652	b-Ionol	1400	C13H22O	194
1653	8-Hydroxylinalyl tiglate	1760	C15H24O3	252
1654	(Z)-Methyl 4-(geranyloxy)-cinnamate	2334	C20H26O3	314
1655	(E)-Methyl 4-(geranyloxy)-cinnamate	2461	C20H26O3	314
1656	Tetradecyl acetate	1775	C16H32O2	256
1657	Benzyl 3-methylbutyrate	1366	C12H16O2	192
1658	Benzyl 2-methylbutyrate	1360	C12H16O2	192
1659	Decanoic acid	1347	C10H20O2	172
1660	n-Octanoic acid	1156	C8H16O2	144

(continued)

No.	chemical name	RI (DB1)	formula	MW
1661	Dihydromayurone	1591	C14H22O	206
1662	Ethyl hexadecanoate	1990	C18H3602	284
1663	8-Hydroxylinalyl propionate	1551	C13H22O3	226
1664	4-Acetoxy-3-methoxyacetophenone	1434	C11H12O4	208
1665	o-Anisaldehyde	1202	C8H8O2	136
1666	2-Octanone	964	C8H16O	128
1667	(E)-trans-Bergamotol	1680	C15H24O	220
1668	Methyl 3-methylpentanoate	853	C7H14O2	130
1669	Methyl 3,7-dimethyloctanoate	1207	C11H22O2	186
1670	Methyl 4-methylhexanoate	974	C8H16O2	144
1671	Muurolan-4,7-oxide	1480	C15H26O	222
1672	cis-Totarol	2252	C20H30O	286
1673	4-Butyl-3-methyl-g-butanolide	1252	C9H1602	156
1674	Isosaccogynol	1740	C15H22O	218
1675	Isosaccogynone	1744	C15H20O	216
1676	Taylorione	1617	C15H220	218
1677	2-a-Acetoxy-11-methoxyamorpha-4,7-diene	1846	C18H28O3	292
1678	2-a-Acetoxyamorpha-4,7(11)-dien-8-one	1963	C17H24O3	276
1679	Neryl formate	1265	C11H18O2	182
1680	Geranyl butyrate	1534	C15H26O2	238
1681	Nerylpropionate	1451	C14H24O2	224
1682	Geranyl tiglate	1670	C15H24O2	236
1683	2-Methylbutyl angelate	1130	C10H18O2	170
1684	3-Methylbutyl angelate	1125	C10H18O2	170
1685	Methallyl angelate	1040	C9H14O2	154
1686	3-Methylbutyl methacrylate	1018	C9H16O2	156
1687	3-Methylbutyl isobutyrate	994	C9H18O2	158
1688	3-Methylpentyl isobutyrate	1095	C10H20O2	172
1689	3-Methylpentyl angelate	1230	C11H20O2	184
1690	Butyl angelate	1065	C9H16O2	156
1691	10-Acetoxy-4-oplopanone	1874	C17H28O3	280
1692	Butyl benzoate	1556	C11H1402	178
1693	Propyl benzoate	1347	C10H12O2	164
1694	Phenylacetonitrile	1085	C8H7N	117
1695	Hexadecyl acetate	1847	C18H36O2	284
1696	Octadecyl acetate	2084	C20H40O2	312
1697	Octadecanal	2012	C18H36O	268
1698	Hexadecanal	1782	C16H32O	240

(continued)

No.	chemical name	RI (DB1)	formula	MW
1699	Heptacosane	2700	C27H56	380
1700	Docosanal	2338	C22H44O	324
1701	cis-b-Elemene	1381	C15H24	204
1702	Eicosanal	2170	C20H40O	296
1703	1-Methyl-3-(2-oxopropyl)-4-(1-methylethenyl)-cyclohexene	1409	C13H20O	192
1704	Ginsenol	1621	C15H26O	222
1705	4-n-Propylanisol	1254	C10H14O	150
1706	n-Decyl acetate	1390	C12H24O2	200
1707	Dimethyl-tetrasulfide	1181	C2H6S4	158
1708	Dimethyl trisulfide	942	C2H6S3	126
1709	S,S-Dimethyl dithiocarbonate	935	C3H6OS2	122
1710	2,5-Diethyltetrahydrofuran	875	C8H16O	128
1711	Neoiso-isopulegol acetate	1366	C12H20O2	196
1712	Methyl 2-hydroxy-4-methoxy-6-methylbenzoate	1555	C10H12O4	196
1713	1-Octen-3-yl 3-methylbutyrate	1315	C13H24O2	212
1714	1-Octen-3-yl 2-methylbutyrate	1310	C13H24O2	212
1715	Oct-1-en-3-yl butyrate	1266	C12H22O2	198
1716	1-Octen-3-yl isobutyrate	1223	C12H22O2	198
1717	1-Octen-3-yl propanoate	1181	C11H20O2	184
1718	14-Hydroxy-4,5-dihydro-b-caryophyllene	1692	C15H26O	222
1719	14-Hydroxy-b-caryophyllene	1656	C15H24O	220
1720	4,5-Dihydro-b-caryophyllen-14-al (Isomer 1)	1610	C15H24O	220
1721	4,5-Dihydro-b-caryophyllen-14-al (Isomer 2)	1621	C15H24O	220
1722	4-Desmethylcaryophyll-8(14)-en-5-one	1521	C14H22O	206
1723	Isocaryophyllen-14-al (b-Betulenal)	1630	C15H22O	218
1724	1-Angeloyloxyverbenone	1694	C15H20O3	248
1725	4-Hydroxy-2-methyl acetophenone	1254	C9H10O2	150
1726	7-epi-1,2-Dehydrosesquicineole	1460	C15H24O	220
1727	1,2-Dimethoxybenzene (Veratrol)	1117	C8H10O2	138
1728	(E)-Isoelemicin	1614	C12H16O3	208
1729	(Z)-Isoelemicin	1559	C12H16O3	208
1730	1,2,4-Trimethoxybenzene	1330	C9H12O3	168
1731	p-Menth-1-en-9-al (Isomer 1)	1188	C10H16O	152
1732	p-Menth-1-en-9-al (Isomer 2)	1190	C10H16O	152
1733	(Methoxymethyl)-benzene	964	C8H10O	122
1734	1,4-Dimethoxybenzene	1132	C8H10O2	138
1735	6,10,14-Trimethylpentadecan-2-one	1817	C18H36O	268
1736	(Z)-a-Damascone	1343	C13H20O	192

(continued)

No.	chemical name	RI (DB1)	formula	MW
1737	Lilac alcohol (2R,2'R,5'S)	1210	C10H18O2	170
1738	Lilac alcohol (2R,2'S,5'S))	1196	C10H18O2	170
1739	Lilac alcohol (2S,2'S,5'S)	1185	C10H18O2	170
1740	Lilac aldehyde(2R, 2'R, 5'S)	1146	C10H16O2	168
1741	Lilac aldehyde (2R,2'S,5'S)	1133	C10H16O2	168
1742	Lilac aldehyde (2S,2'S,5'S)	1124	C10H16O2	168
1743	Methyl citronellate	1245	C11H20O2	184
1744	Myli-4(15)-ene	1418	C15H22	202
1745	Maali-4(15)-en-1-ol	1624	C15H24O	220
1746	(E)-Taylopyran	1530	C15H22O	218
1747	7-epi-Bourbon-3-ene 5,11-oxide	1473	C15H22O	218
1748	Mylian-3-one	1593	C15H22O	218
1749	Myli-4(15)-en-3-one	1610	C15H20O	216
1750	5,5-Dimethyl-1-vinylbicyclo-[2.1.1]hexane	931	C10H16	136
1751	Cara-2,4-diene	900	C10H14	134
1752	Eudesm-4(15)en-6-one	1616	C15H24O	220
1753	Eudesm-4-en-6-one	1605	C15H24O	220
1754	Guaia-3,9-diene 5,11-oxide	1519	C15H22O	218
1755	Guaia-3,10(14)-diene 5,11-oxide	1555	C15H22O	218
1756	3-Ethylacetophenone	1260	C10H12O	148
1757	4-Ethylacetophenone	1240	C10H12O	148
1758	(6Z,8E)-Megastigma-4,6,8-trien-3-one	1553	C13H18O	190
1759	(E,E)-Megastigma-4,6,8-trien-3-one	1598	C13H18O	190
1760	Aromadendra-1(10),4(15)-diene	1506	C15H22	202
1761	Perfora-1,7-diene	1543	C15H24	204
1762	Guaia-1(10),11-diene	1516	C15H24	204
1763	Guaia-9,11-diene	1522	C15H24	204
1764	Norpinguisone	1600	C14H18O2	218
1765	Methyl norpinguisonate	1776	C15H18O4	262
1766	Bisabola-1,3,5,7(14)-tetraene	1484	C15H22	202
1767	Lemnalone	1611	C15H22O	218
1768	Methyl 2,4-Dimethoxy-6-methylbenzoate	1588	C11H14O4	210
1769	Methyl 6-Methoxy-2-methyl-3,4-methylendioxybenzoate	1661	C11H12O5	224
1770	Methyl 6-Hydroxy-2-methyl-3,4-methylendioxybenzoate	1640	C10H1005	210
1771	Methyl 3,4,6-trimethoxy-2-methylbenzoate	1705	C12H16O5	240
1772	4-Methoxyphenylacetaldehyde	1255	C9H10O2	150
1773	Aromadendra-4,9-diene	1534	C15H22	202
1774	Aromadendra-1(10),4-diene	1462	C15H22	202

(continued)

No.	chemical name	RI (DB1)	formula	MW
1775	Aromadendra-4,10(14)-diene	1440	C15H22	202
1776	5,6-Dihydro-1,4-dimethylazulene	1428	C12H14	158
1777	3,4,5,6-Tetrahydro-1,4-dimethylazulene	1246	C12H16	160
1778	2,3,3a,4,5,6-Hexahydro-1,4-dimethylazulen-3-ol	1447	C12H18O	178
1779	3a-Acetoxyamorpha-4,7(11)-diene	1780	C17H26O2	262
1780	Amorpha-2,4,7(11)-triene	1449	C15H22	202
1781	Amorpha-4,7(11)-dien-2-one	1645	C15H22O	218
1782	2a-Acetoxyamorpha-4,7(11)-diene	1796	C17H26O2	262
1783	2b-Acetoxyamorpha-4,7(11)-diene	1722	C17H26O2	262
1784	9a-Hydroxyamorpha-4,7(11)-diene	1680	C15H24O	220
1785	7b-Hydroxyamorpha-4,11-diene	1615	C15H24O	220
1786	3a-Hydroxyamorpha-4,7(11)-diene	1665	C15H24O	220
1787	Amorpha-4,7(11)-dien-3-one	1677	C15H22O	218
1788	Eudesma-4,11-dien-9-one	1649	C15H22O	218
1789	2,8-Epoxyamorpha-4,7(11)-diene	1597	C15H22O	218
1790	5,9-Epoxyamorpha-3,7(11)-diene	1594	C15H22O	218
1791	n-Tridecanal	1493	C13H26O	198
1792	(E)-Non-2-en-4-one 306	1098	C9H16O	140
1793	(E)-3-Methylnon-2-en-4-one	1190	C10H18O	154
1794	Isotheaspirane (Isomer 1)	1263	C13H22O	194
1795	Isotheaspirane (Isomer 1)	1279	C13H22O	194
1796	Chiloscyphone	1576	C15H22O	218
1797	2-Hydroxy-3,5-dimethoxy-9,10-dihydrophenanthrene	2251	C16H16O3	256
1798	4,5-Dihydroxy-3-methoxy-9,10-dihydrophenanthrene	2330	C15H14O3	242
1799	Isozierene	1556	C15H22	202
1800	Isogermacrene A	1502	C15H24	204
1801	Iso-b-elemene	1359	C15H24	204
1802	n-Decyl butanoate	1567	C14H28O2	228
1803	g-Palmitolactone	2081	C16H30O2	254
1804	n-Octyl butanoate	1371	C12H24O2	200
1805	Benzyl butanoate	1313	C11H14O2	178
1806	n-Butyl butyrate	970	C8H1602	1144
1807	n-Heptyl butanoate	1270	C11H22O2	186
1808	2-Phenylethyl butyrate	1412	C12H16O2	192
1809	Ethyl 2-phenylhexanoate	1617	C14H20O2	220
1810	Methyl 4-hydroxybenzoate	1414	C8H8O3	152
1811	n-Propyl 4-hydroxybenzoate	1584	C10H12O3	180
1812	n-Octyl hexanoate	1567	C14H28O2	228

(continued)

No.	chemical name	RI (DB1)	formula	MW
1813	11-b-Hydroxykauren-15-a-yl acetate	2459	C22H34O3	346
1814	a-Campholenic acid	1304	C10H16O2	168
1815	5-Acetoxybornan-2-one	1399	C12H18O3	210
1816	n-Heptadecanal	1908	C17H34O	254
1817	Ventricos-7(13)-ene	1357	C15H24	204
1818	Helminthogermacrene	1503	C15H24	204
1819	allo-Aromadendra-4(15),10(14)-diene	1457	C15H22	202
1820	Methyl 3-phenylpropanoate	1242	C10H12O2	164
1821	Nepetalactone (Isomer 1)	1331	C10H14O2	166
1822	(all-E)-Geranylcitronellol	2160	C20H36O	292
1823	Cyclooctatetraene	837	C8H8	104
1824	4-(4-Hydroxyphenyl)-butan-2-ol	1518	C10H14O2	166
1825	Lowry's phenol	1684	C12H16O4	224
1826	Platyphyllol	1588	C12H16O4	224
1827	Eugenitine	1944	C12H1204	220
1828	Isoeugenitine	1963	C12H12O4	220
1829	Dihydrocolumellarine	1889	C15H22O2	234
1830	Myltaylenol	1727	C15H24O	220
1831	a-Gorgonene	1490	C15H24	204
1832	Aromadendra-4(15),10(14)-dien-1-ol	1579	C15H22O	218
1833	10-epi-Dihydroagarofuran	1520	C15H26O	222
1834	3,7-Dimethyl-3,7-dihydroxyoct-1-ene	1198	C10H20O2	172
1835	Agarospirol	1635	C15H26O	222
1836	10a-Hydroxy-12-prenylguai-11-ene	2111	C20H34O	290
1837	5-Formyl-2-hydroxy-(3-methylbutyro)-phenone	1617	C12H14O3	206
1838	4-Hydroxybenzaldehyde	1316	C7H6O2	122
1839	1,3,5-Trimethyl-1,3,5-triazin-2,4,6-trione	1327	C6H903N3	171
1840	5-Formyl-2-hydroxy-(3-hydroxy-3-methylbutyro)-phenone	1660	C12H14O4	222
1841	Octadecanoic acid	2182	C18H36O2	284
1842	Longipinanol, high temp.	1563	C15H26O	222
1843	Artemiseol	970	C10H16O	152
1844	a-Cyclocitral	1103	C10H16O	152
1845	(3E,5Z)-Undeca-1,3,5-triene (Isomer 2)	1133	C11H18	150
1846	Undeca-1,3,5-triene (Isomer 1)	1117	C11H18	150
1847	4-(4-Methoxyphenyl)-butan-2-one	1453	C11H14O2	178
1848	Atranol	1511	C8H8O3	152
1849	Chloroatranol	1466	C8H7O3Cl	186
1850	Myrtenyl methyl ether	1145	C11H18O	166

(continued)

No.	chemical name	RI (DB1)	formula	MW
1851	8,14-Cedrane oxide	1536	C15H24O	220
1852	Camphene hydrate	1143	C10H18O	154
1853	6-Camphenone	1082	C10H14O	150
1854	Desmethoxyencecalin	1617	C13H1402	202
1855	Bisabola-1,3,5,7-tetraene	1554	C15H22	202
1856	Myltayl-4-ene	1383	C15H24	204
1857	Gorgon-11-en-4-ol	1617	C15H26O	222
1858	a-Taylorione	1586	C15H22O	218
1859	Taylocyclan	1477	C15H22O	218
1860	Taynudol	1709	C15H22O	218
1861	Taylofuran	1635	C15H24O2	236
1862	3-Acetoxytaylorione	1918	C17H24O3	276
1863	Copalol	2265	C20H34O	290
1864	3a-Acetoxybicyclogermacrene	1769	C17H26O2	262
1865	Plagiooxide	1420	C15H26O	222
1866	Gymnomitr-3(15)-en-5b-ol	1653	C15H24O	220
1867	5b-Acetoxy-gymnomitr-3(15)-ene	1758	C17H26O2	262
1868	4b,5b-Diacetoxygymnomitr-3(15)-ene	1943	C19H28O4	320
1869	15-Acetoxygymnomitr-3-ene	1797	C17H26O2	262
1870	3,15-b-Epoxy-4b-acetoxygymnomitrane	1875	C17H26O3	278
1871	3,15-a-Eppoxy-4b-acetoxygymnomitrane	1887	C17H26O3	278
1872	Iso-a-humulene	1474	C15H24	204
1873	cis-Anethol	1230	C10H12O	148
1874	Cadina-4,11-dien-15-al	1704	C15H22O	218
1875	Cadina-4,11-dien-15-ol	’1713	C15H26O	222
1876	a-Barbatenal	1659	C15H22O	218
1877	15-Nor-3-gymnomitrone	1609	C14H22O	206
1878	Bergaptene	2023	C12H8O4	216
1879	Peucedanin	2243	C15H14O4	258
1880	syn-Copalol	2165	C20H34O	290
1881	Melanene	1455	C15H24	204
1882	Panaxene	1312	C15H24	204
1883	Panaginsene	1336	C15H24	204
1884	Iso-g-bisabolene	1523	C15H24	204
1885	Viscida-4,9,14-triene	1862	C20H32	272
1886	Trichodiene	1523	C15H24	204
1887	2-Methyl-3-(4-methoxyphenyl)-prop-2-ene	1324	C11H14O	162
1888	Gymnomitr-3(15)-en-12-oic acid	1790	C15H22O2	234

(continued)

No.	chemical name	RI (DB1)	formula	MW
1889	12-Acetoxygymnomitr-3(15)-ene	1795	C17H26O2	262
1890	Gymnomitr-3 (15)-en-12-al	1627	C15H22O	218
1891	Scapanol	1586	C15H26O	222
1892	Hydroxycitronellal	1263	C10H20O2	172
1893	2-(2-Ethoxyethoxy)-ethanol	985	C6H14O3	134
1894	Di-(2-hydroxypropyl)-ether	1003	C6H14O3	134
1895	Benzyl propionate	1231	C10H12O2	164
1896	2-Methyl-3-(4-isopropylphenyl)-propanal	1433	C13H18O	190
1897	(Z)-b-Curcumen-12-ol	1732	C15H24O	220
1898	(Z)-b-Phenylethyl cinnamate	2006	C17H16O2	252
1899	(E)-b-Phenylethyl cinnamate	2123	C17H16O2	252
1900	Phenylethyl benzoate	1815	C15H14O2	226
1901	Phenylethyl phenyl acetate	1868	C16H16O2	240
1902	Phenylethyl propionate	1468	C11H14O2	178
1903	2-(4-Methoxyphenyl)-5-methoxy-2,3-dihydrobenzo[b]furan	2237	C16H16O3	256
1904	(Z)-Coriandrin	2234	C12H15ONS2	253
1905	(Z)-Coridrin	1708	C10H9ONS	191
1906	(E)-Coridrin	1784	C10H9ONS	191
1907	2-Methylene-6,6-dimethylcyclohex-3-ene-1-carbaldehyde	1092	C10H14O	150
1908	1-p-Menthan-8-thiol	1196	C10H20S	172
1909	1-p-Menthen-8-thiol	1279	C10H18S	170
1910	5,5-Dimethylcyclohex-2-en-1,4-dione	1002	C8H10O2	138
1911	Neoisomenthol	1176	C10H20O	156
1912	Menth-2-en-1,4-diol	1269	C10H18O2	170
1913	Carvone hydrate	1388	C10H1602	168
1914	Carvone hydrate acetate	1528	C12H18O3	210
1915	8-Hydroxylinalyl isobutyrate	1588	C14H24O3	240
1916	Lyral	1637	C13H22O2	210
1917	Lyral (Isomer)	1625	C13H22O2	210
1918	2-(4-tert-butylbenzyl)-propione aldehyde	1501	C14H20O	204
1919	Methyl 2-octynoate	1177	C9H14O2	154
1920	Caparapidiol	1686	C15H28O2	240
1921	Jaeschkeanadiol	1754	C15H26O2	238
1922	2,8-Epithio-cis-p-menthane	1242	C10H18S	170
1923	Gorgona-1,4(15),11-triene	1426	C15H22	202
1924	Aromadendra-1(10),3-diene	1509	C15H22	202
1925	8-Hydroxylinalyl 2-methylbutyrate	1688	C15H2603	254
1926	trans-Pinane	951	C10H18	138

(continued)

No.	chemical name	RI (DB1)	formula	MW
1927	4b-Acetoxygymnomitr-3(15)-ene	1739	C17H26O2	262
1928	1,8-Dimethyl-3-ethyl-2,9-dioxabicyclo[3.3.1]non-7-en-6-one	1344	C11H16O3	196
1929	2,6-Diethyl-2,3-dihydro-4H-pyran-4-one	1221	C9H14O2	154
1930	Frontaline	907	C8H14O2	142
1931	endo-Brevicomin	1039	C9H16O2	156
1932	cis-Pinane	963	C10H18	138
1933	Chalcograne (Isomer 1)	1051	C9H16O	140
1934	Chalcograne (Isomer 2)	1055	C9H16O	140
1935	Lineatine	1102	C10H16O2	168
1936	Methyl n-propyl trisufide	1121	C4H10S3	154
1937	(E) n-Propyl 1-propenyl disulfide	1063	C6H12S2	148
1938	Di-n-propyl trisulfide	1302	C6H14S3	182
1939	Methyl n-propyl disulfide	900	C4H10S2	122
1940	Di-n-propyl disulfide	1081	C6H14S2	150
1941	Di-n-propyl tetrasulfide	1558	C6H14S4	214
1942	5-Pentyl-3,4,5-trimethyl-5H-furan-2-one	1474	C12H20O2	196
1943	Plagiochilline T	1665	C15H20O	216
1944	Plagiochilline U	1625	C15H22O	218
1945	5-Methylcyclohex-2-en-1 -one	935	C7H10O	110
1946	3-Ethylcyclohexanone	1020	C8H14O	126
1947	Methyl 3-ethyl-4-methylpentanoate	1021	C9H18O2	158
1948	2,4-Diethyloct-1-ene	1106	C12H24	168
1949	Methyl trans-Dihydrojasmonate	1623	C13H22O3	226
1950	cis-Methyl dihydrojasmonate	1651	C13H22O3	226
1951	1,7-Dioxaspiro[5.5]undecane	1108	C9H16O2	156
1952	(2Z,4E)-Methyl abscisate	2076	C16H22O4	278
1953	(2Z,4E)-Methyl phaseate	2141	C16H22O5	294
1954	(2E,4E)-Methyl abscisate	2164	C16H22O4	278
1955	Pityol	945	C8H16O2	144
1956	6-Ethyl-2-methyl-2,3-dihydro-4H-pyran-2-one	1117	C8H12O2	140
1957	n-Nonyl acetate	1283	C11H22O2	186
1958	4-epi-Maaliol	1549	C15H26O	222
1959	Plagiochiline H	1807	C17H24O3	276
1960	5-Methyloctahydrofuro[3,2-b]oxepine	1028	C9H16O2	156
1961	Methyl 2-hydroxyhexanoate	993	C7H14O3	146
1962	Methyl 2-hydroxytetradecanoate	1838	C15H30O3	258
1963	Seudenol	941	C7H12O	112
1964	2,8-Dimethyl-1,7-dioxaspiro[5.5]undecane (Isomer 1)	1121	C11H20O2	184

(continued)

No.	chemical name	RI (DB1)	formula	MW
1965	2,8-Dimethyl-1,7-dioxaspiro[5.5]undecane (Isomer 2)	1189	C11H20O2	184
1966	4-Methyl-2-buten-4-olide	869	C5H6O2	98
1967	Methyl 2-methyltetradecanoate	1758	C16H32O2	256
1968	Methyl 3-methylpentanoate	840	C7H14O2	130
1969	Methyl 2-methylundecanoate	1509	C13H26O2	214
1970	Methyl 2-methyldodecanoate	1550	C14H28O2	228
1971	Methyl 2-hydroxyisopentanoate	845	C6H1203	132
1972	Methyl 2-hydroxypentanoate	894	C6H12O3	132
1973	4a-Methyloctahydronaphthalen-2-one	1369	C11H18O	166
1974	Methyl madelate	1245	C9H10O3	166
1975	Methyl 2-hydroxydodecanoate	1627	C13H26O3	230
1976	1-Phenylethanol	1037	C8H10O	122
1977	2,3,5-Trimethylvalerolactone	1158	C8H14O2	142
1978	10-Methyldecalin-2,7-dione	1520	C11H16O2	180
1979	6-Hexyl-5,6-dihydropyran-2-one	1551	C11H18O2	182
1980	Methyl 2-methylpentadecanoate	2195	C17H34O2	270
1981	2,3-Epoxycinnamyl alcohol	1309	C9H10O2	150
1982	Methyl 2-methylhexadecanoate	1972	C18H36O2	284

[0041] An exemplary therapeutic compound conforming with any of the disclosed embodiments may comprise for instance a compound including at least two of delta-9-tetrahydrocannabinol or tetrahydrocannabinolic acid, and cannabidiol and optionally at least one of the listed terpenes Still further an exemplary therapeutic compound conforming with any of the disclosed embodiments may comprise for instance a compound including 20mg of delta-9-tetrahydrocannabinol and 10mg of cannabidiol preferably administered every 6-8 hours as needed. Still further an exemplary therapeutic compound conforming with any of the disclosed embodiments may comprise for instance a compound including 10mg of delta-9-tetrahydrocannabinol and 5mg of cannabidiol preferably administered every 6-8 hours as needed. Still further an exemplary therapeutic compound conforming with any of the disclosed embodiments may comprise for instance a compound including 20mg of delta-9-tetrahydrocannabinol and 20mg of cannabidiol preferably administered every 6-8 hours as needed. Still further an exemplary therapeutic compound conforming with any of the disclosed embodiments may comprise for instance a compound including 10mg of delta-9-tetrahydrocannabinol and 10mg of cannabidiol preferably administered every 6-8 hours as needed. Still further an exemplary therapeutic compound conforming with any of the disclosed embodiments may comprise for instance a compound including 15mg of delta-9-tetrahydrocannabinol and 10mg of cannabidiol preferably administered every 6-8 hours as needed.

[0042] Further, enumerated embodiments are described below.

[0043] Embodiment 1. A pharmaceutical composition comprising: (a) tetrahydrocannabinol (THC) and cannabidiol (CBD) in a THC:CBD ratio of from 1:1.5 to 3:1 by weight; and (b) one or more terpenes listed in Table 1.

[0044] Embodiment 2. The pharmaceutical composition of embodiment 1, wherein the THC:CBD ratio is about: 1:1.5, 1:1.4, 1:1.3, 1:1.2, 1:1.1, 1:1, 1.1:1, 1.2:1, 1.3:1, 1.4:1, 1.5:1, 1.6:1, 1.7:1, 1.8:1, 1.9:1, 2:1, 2.1:1, 2.2:1, 2.3:1, 2.4:1, 2.5:1, 2.6:1, 2.7:1, 2.8:1, 2.9:1, or 3:1.

[0045] Embodiment 3. The pharmaceutical composition of embodiment 1, wherein the THC:CBD ratio is from 1.5:1 to 2:1.

[0046] Embodiment 4. The pharmaceutical composition of embodiment 1, wherein the THC:CBD ratio is about 1.5:1.

[0047] Embodiment 5. The pharmaceutical composition of any one of embodiments 1-4, wherein the pharmaceutical composition comprises: 1 - 50 mg, 5-40 mg, 7.5 - 30 mg, 10 - 20 mg, or 12.5 - 17.5 mg tetrahydrocannabinol (THC) per dose.

[0048] Embodiment 6. The pharmaceutical composition of any one of embodiments 1-4, wherein the pharmaceutical composition comprises about: 1 mg, 2.5 mg, 5 mg, 7.5 mg, 10 mg, 12.5 mg, 15 mg, 17.5 mg, 20 mg, 25 mg, 30 mg, 35

mg, 40 mg, 45 mg, or 50 mg tetrahydrocannabinol (THC) per dose.

[0049] Embodiment 7. The pharmaceutical composition of any one of embodiments 1-4, wherein the pharmaceutical composition comprises about 10 - 20 mg tetrahydrocannabinol (THC) per dose.

[0050] Embodiment 8. The pharmaceutical composition of any one of embodiments 1-4, wherein the pharmaceutical composition comprises about 15- 20 mg tetrahydrocannabinol (THC) per dose.

[0051] Embodiment 9. The pharmaceutical composition of any one of embodiments 1-8, wherein the pharmaceutical composition comprises: 1 - 35 mg, 2.5 - 30 mg, 5 - 25 mg, 6 - 14 mg, 10 - 12 mg cannabidiol (CBD) per dose.

[0052] Embodiment 10. The pharmaceutical composition of any one of embodiments 1-8, wherein the pharmaceutical composition comprises about: 1 mg, 1.5 mg, 2 mg, 2.5 mg, 3 mg, 4 mg, 5 mg, 6 mg, 7 mg, 8 mg, 9 mg, 10 mg, 11 mg, 12 mg, 13 mg, 14 mg, 15 mg, 17.5 mg, 20 mg, 22.5 mg, 25 mg, 27.5 mg, or 30 mg cannabidiol (CBD) per dose.

[0053] Embodiment 11. The pharmaceutical composition of any one of embodiments 1-8, wherein the pharmaceutical composition comprises 6 - 14 mg cannabidiol (CBD).

[0054] Embodiment 12. The pharmaceutical composition of any one of embodiments 1-8, wherein the pharmaceutical composition comprises 10 - 12 mg cannabidiol (CBD),

[0055] Embodiment 13. The pharmaceutical composition of any one of embodiments 1-12, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, α-humulene, linalool, p-cymene, camphene, cis-nerolidol, terpinolene, isopulegol, caryophyllene oxide, δ-limonene, geraniol, guaiol, α-bisabolol, 3-carene, β -pinene, γ-terpinene, or a combination thereof.

[0056] Embodiment 14. The pharmaceutical composition of any one of embodiments 1-12, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, α-humulene, linalool, p-cymene, and camphene.

[0057] Embodiment 15. The pharmaceutical composition of any one of embodiments 1-12, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, and α-humulene.

[0058] Embodiment 16. The pharmaceutical composition of any one of embodiments 1-12, wherein the one or more terpenes comprise β-myrcene, ocimene, cis-nerolidol, terpinolene, isopulegol, caryophyllene oxide, δ-limonene, geraniol, guaiol, and α-bisabolol.

[0059] Embodiment 17. The pharmaceutical composition of any one of embodiments 1-12, wherein the one or more terpenes comprise β-myrcene, ocimene, cis-nerolidol, terpinolene, isopulegol, caryophyllene oxide, δ-limonene, geraniol, guaiol, α-bisabolol, and 3-carene.

[0060] Embodiment 18. The pharmaceutical composition of any one of embodiments 1-12, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-humulene, linalool, ρ -cymene, camphene, 3-carene, β -pinene, and γ-terpinene.

[0061] Embodiment 19. The pharmaceutical composition of any one of embodiments 1-12, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, α-humulene, linalool, p-cymene, camphene, 3-carene, β -pinene, and γ-terpinene.

[0062] Embodiment 20. The pharmaceutical composition of any one of embodiments 1-19, wherein the one or more terpenes comprise β-myrcene, and wherein the pharmaceutical composition comprises 1 - 100 mg, 20 - 80 mg, 30 - 60 mg, 40 - 50 mg, 1 - 10 mg, 1.5 - 7.5 mg, or 2 - 5 mg of β-myrcene per dose.

[0063] Embodiment 21. The pharmaceutical composition of any one of embodiments 1-19, wherein the one or more terpenes comprise β-myrcene, and wherein the pharmaceutical composition comprises about: 1 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.1 mg, 2.2 mg, 2.3 mg, 2.4 mg, 2.5 mg, 2.6 mg, 2.7 mg, 2.8 mg, 2.9 mg, 3 mg, 3.1 mg, 3.2 mg, 3.3 mg, 3.4 mg, 3.5 mg, 3.6 mg, 3.7 mg, 3.8 mg, 3.9 mg, 4 mg, 4.5 mg, 5 mg, 6 mg, 7 mg, 8 mg, 9 mg, or 10 mg of β-myrcene per dose.

[0064] Embodiment 22. The pharmaceutical composition of any one of embodiments 1-19, wherein the one or more terpenes comprise β-myrcene, and wherein the pharmaceutical composition comprises about: 25 mg, 30 mg, 35 mg, 40 mg, 45 mg, 50 mg, 55 mg, or 60 mg of β-myrcene per dose.

[0065] Embodiment 23. The pharmaceutical composition of any one of embodiments 1-19, wherein the one or more terpenes comprise β-myrcene, and wherein the pharmaceutical composition comprises 1.5 - 7.5 mg of β-myrcene per dose.

[0066] Embodiment 24. The pharmaceutical composition of any one of embodiments 1-19, wherein the one or more terpenes comprise β-myrcene, and wherein the pharmaceutical composition comprises 30 - 60 mg of β-myrcene per dose.

[0067] Embodiment 25. The pharmaceutical composition of any one of embodiments 1-24, wherein the one or more terpenes comprise β-caryophyllene, and wherein the pharmaceutical composition comprises 1 - 20 mg, 2 - 10 mg, 2.5 - 5 mg, or 3 - 8 mg of β-caryophyllene per dose.

[0068] Embodiment 26. The pharmaceutical composition of any one of embodiments 1-24, wherein the one or more terpenes comprise β-caryophyllene, and wherein the pharmaceutical composition comprises about 1 mg, 1.5 mg, 2 mg, 2.25 mg, 2.5 mg, 2.75 mg, 3 mg, 3.1 mg, 3.2 mg, 3.3 mg, 3.4 mg, 3.5 mg, 3.6 mg, 3.7 mg, 3.8 mg, 3.9 mg, 4 mg, 4.25 mg, 4.5 mg, 4.75 mg, 5 mg, 5.5 mg, 6 mg, 6.5 mg, 7 mg, 7.5 mg, 7.6 mg, 8 mg, 9 mg, 10 mg, 12.5 mg, 15 mg, or 20 mg of P-caryophyllene per dose.

[0069] Embodiment 27. The pharmaceutical composition of any one of embodiments 1-24, wherein the one or more terpenes comprise β-caryophyllene, and wherein the pharmaceutical composition comprises 2.5 - 5 mg of β-caryophyllene per dose.

[0070] Embodiment 28. The pharmaceutical composition of any one of embodiments 1-27, wherein the one or more terpenes comprise ocimene, and wherein the pharmaceutical composition comprises 1 - 20 mg, 2 - 10 mg, 2.3 - 4.7 mg, or 3 - 8 mg of ocimene per dose.

[0071] Embodiment 29. The pharmaceutical composition of any one of embodiments 1-27, wherein the one or more terpenes comprise ocimene, and wherein the pharmaceutical composition comprises about 1 mg, 1.1 mg, 1.5 mg, 2 mg, 2.1 mg, 2.3 mg, 2.5 mg, 2.75 mg, 3 mg, 3.1 mg, 3.2 mg, 3.3 mg, 3.4 mg, 3.5 mg, 3.6 mg, 3.7 mg, 3.8 mg, 3.9 mg, 4 mg, 4.2 mg, 4.5 mg, 4.7 mg, 5 mg, 5.5 mg, 6 mg, 6.5 mg, 7 mg, 7.5 mg, 7.6 mg, 8 mg, 9 mg, 10 mg, 12.5 mg, 15 mg, or 20 mg of ocimene per dose.

[0072] Embodiment 30. The pharmaceutical composition of any one of embodiments 1-27, wherein the one or more terpenes comprise ocimene, and wherein the pharmaceutical composition comprises 2.3 - 4.7 mg of ocimene per dose.

[0073] Embodiment 31. The pharmaceutical composition of any one of embodiments 1-30, wherein the one or more terpenes comprise α-pinene, and wherein the pharmaceutical composition comprises 0.1 - 10 mg, 0.5 - 5 mg, or 1.1 - 2.1 mg of α-pinene per dose.

[0074] Embodiment 32. The pharmaceutical composition of any one of embodiments 1-30, wherein the one or more terpenes comprise α-pinene, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.1 mg, 2.2 mg, 2.3 mg, 2.4 mg, 2.5 mg, 2.75 mg, 3 mg, 3.5 mg, 4 mg, 4.5 mg, 5 mg, 7.5 mg, or 10 mg of α-pinene per dose.

[0075] Embodiment 33. The pharmaceutical composition of any one of embodiments 1-30, wherein the one or more terpenes comprise α-pinene, and wherein the pharmaceutical composition comprises 1.1 - 2.1 mg of α-pinene per dose.

[0076] Embodiment 34. The pharmaceutical composition of any one of embodiments 1-33, wherein the one or more terpenes comprise α- humulene, and wherein the pharmaceutical composition comprises 0.1 - 5 mg, 0.5 - 3.5 mg, or 0.8 - 1.6 mg of α- humulene per dose.

[0077] Embodiment 35. The pharmaceutical composition of any one of embodiments 1-33, wherein the one or more terpenes comprise α- humulene, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.1 mg, 2.2 mg, 2.3 mg, 2.4 mg, 2.5 mg, 2.6 mg, 2.7 mg, 2.8 mg, 2.9 mg, 3 mg, 3.1 mg, 3.2 mg, 3.5 mg, 4 mg, 4.5 mg, or 5 mg of α- humulene per dose.

[0078] Embodiment 36. The pharmaceutical composition of any one of embodiments 1-33, wherein the one or more terpenes comprise α- humulene, and wherein the pharmaceutical composition comprises 0.8 - 1.6 mg of α- humulene per dose.

[0079] Embodiment 37. The pharmaceutical composition of any one of embodiments 1-36, wherein the one or more terpenes comprise linalool, and wherein the pharmaceutical composition comprises 0.1 - 2 mg, 0.2 - 1.5 mg, or 0.3 - 0.9 mg of linalool per dose.

[0080] Embodiment 38. The pharmaceutical composition of any one of embodiments 1-36, wherein the one or more terpenes comprise linalool, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, of 2 mg of linalool per dose.

[0081] Embodiment 39. The pharmaceutical composition of any one of embodiments 1-36, wherein the one or more terpenes comprise linalool, and wherein the pharmaceutical composition comprises 0.3 - 0.9 mg of linalool per dose.

[0082] Embodiment 40. The pharmaceutical composition of any one of embodiments 1-39, wherein the one or more terpenes comprise p-cymene, and wherein the pharmaceutical composition comprises 0.1 - 20 mg, 0.25 - 10 mg, 5 - 10 mg, or 0.5 - 0.9 mg of p-cymene per dose.

[0083] Embodiment 41. The pharmaceutical composition of any one of embodiments 1-39, wherein the one or more terpenes comprise p-cymene, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.5 mg, 3 mg, 4 mg, 5 mg, 5.5 mg, 6 mg, 6.5 mg, 6.75 mg, 7 mg, 7.1 mg, 7.2 mg, 7.3 mg, 7.4 mg, 7.5 mg, 8 mg, 9 mg, 10 mg, 12.5 mg, 15 mg or 20 mg of p-cymene per dose.

[0084] Embodiment 42. The pharmaceutical composition of any one of embodiments 1-39, wherein the one or more terpenes comprise p-cymene, and wherein the pharmaceutical composition comprises 0.5 - 0.9 mg of p-cymene per dose.

[0085] Embodiment 43. The pharmaceutical composition of any one of embodiments 1-42, wherein the one or more terpenes comprise camphene, and wherein the pharmaceutical composition comprises 0.01 - 2 mg, 0.02 - 1 mg, 0.03 - 0.5 mg, or 0.05 to 0.15 mg of camphene per dose.

[0086] Embodiment 44. The pharmaceutical composition of any one of embodiments 1-42, wherein the one or more terpenes comprise camphene, and wherein the pharmaceutical composition comprises about 0.01 mg, 0.02 mg, 0.03

mg, 0.04 mg, 0.05 mg, 0.06 mg, 0.07 mg, 0.08 mg, 0.09 mg, 0.1 mg, 0.15 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1 mg, 1.25 mg, 1.5 mg, 1.75 mg, or 2 mg of camphene per dose.

[0087] Embodiment 45. The pharmaceutical composition of any one of embodiments 1-42, wherein the one or more terpenes comprise camphene, and wherein the pharmaceutical composition comprises 0.05 - 0.15 mg of camphene per dose.

[0088] Embodiment 46. The pharmaceutical composition of any one of embodiments 1-45, wherein the one or more terpenes comprise cis-nerolidol, and wherein the pharmaceutical composition comprises 0.5 - 20 mg, 1 - 10 mg, or 1.5 to 5 mg of cis-nerolidol per dose.

[0089] Embodiment 47. The pharmaceutical composition of any one of embodiments 1-45, wherein the one or more terpenes comprise cis-nerolidol, and wherein the pharmaceutical composition comprises about 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.25 mg, 2.5 mg, 3 mg, 4 mg, 4.5 mg, 4.8 mg, 5 mg, 6 mg, 7 mg, 8 mg, 9 mg 10 mg, 15 mg, or 20 mg of cis-nerolidol per dose.

[0090] Embodiment 48. The pharmaceutical composition of any one of embodiments 1-45, wherein the one or more terpenes comprise cis-nerolidol, and wherein the pharmaceutical composition comprises 1.5 - 5 mg of cis-nerolidol per dose.

[0091] Embodiment 49. The pharmaceutical composition of any one of embodiments 1-48, wherein the one or more terpenes comprise terpinolene, and wherein the pharmaceutical composition comprises 0.5 - 10 mg, 1 - 5 mg, or 1.2 to 3 mg of terpinolene per dose.

[0092] Embodiment 50. The pharmaceutical composition of any one of embodiments 1-48, wherein the one or more terpenes comprise terpinolene, and wherein the pharmaceutical composition comprises about 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.25 mg, 2.5 mg, 3 mg, 4 mg, 4.5 mg, 4.8 mg, 5 mg, 6 mg, 7 mg, 8 mg, 9 mg 10 mg, 15 mg, or 20 mg of terpinolene per dose.

[0093] Embodiment 51. The pharmaceutical composition of any one of embodiments 1-48, wherein the one or more terpenes comprise terpinolene, and wherein the pharmaceutical composition comprises 1.2 - 3 mg of terpinolene per dose.

[0094] Embodiment 52. The pharmaceutical composition of any one of embodiments 1-51, wherein the one or more terpenes comprise isopulegol, and wherein the pharmaceutical composition comprises 0.1 - 5 mg, 0.5 - 3.5 mg, or 0.8 to 2.3 mg of isopulegol per dose.

[0095] Embodiment 53. The pharmaceutical composition of any one of embodiments 1-51, wherein the one or more terpenes comprise isopulegol, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.3 mg, 2.5 mg, 3 mg, 3.5 mg, 4 mg, 4.5 mg, 4.8 mg, or 5 mg of isopulegol per dose.

[0096] Embodiment 54. The pharmaceutical composition of any one of embodiments 1-51, wherein the one or more terpenes comprise isopulegol, and wherein the pharmaceutical composition comprises 0.8 - 2.3 mg of isopulegol per dose.

[0097] Embodiment 55. The pharmaceutical composition of any one of embodiments 1-54, wherein the one or more terpenes comprise caryophyllene oxide, and wherein the pharmaceutical composition comprises 0.1 - 5 mg, 0.5 - 3.5 mg, or 0.8 to 2.2 mg of caryophyllene oxide per dose.

[0098] Embodiment 56. The pharmaceutical composition of any one of embodiments 1-54, wherein the one or more terpenes comprise caryophyllene oxide, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.2 mg, 2.5 mg, 3 mg, 3.5 mg, 4 mg, 4.5 mg, 4.8 mg, or 5 mg of caryophyllene oxide per dose.

[0099] Embodiment 57. The pharmaceutical composition of any one of embodiments 1-54, wherein the one or more terpenes comprise caryophyllene oxide, and wherein the pharmaceutical composition comprises 0.8 - 2.2 mg of caryophyllene oxide per dose.

[0100] Embodiment 58. The pharmaceutical composition of any one of embodiments 1-57, wherein the one or more terpenes comprise δ-limonene, and wherein the pharmaceutical composition comprises 0.1 - 5 mg, 0.5 - 3.5 mg, or 0.8 to 1.6 mg of δ-limonene oxide per dose.

[0101] Embodiment 59. The pharmaceutical composition of any one of embodiments 1-57, wherein the one or more terpenes comprise δ-limonene, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.2 mg, 2.5 mg, 3 mg, 3.5 mg, 4 mg, 4.5 mg, 4.8 mg, or 5 mg of δ-limonene per dose.

[0102] Embodiment 60. The pharmaceutical composition of any one of embodiments 1-57, wherein the one or more terpenes comprise δ-limonene, and wherein the pharmaceutical composition comprises 0.8 - 1.6 mg of δ-limonene per dose.

[0103] Embodiment 61. The pharmaceutical composition of any one of embodiments 1-60, wherein the one or more terpenes comprise geraniol, and wherein the pharmaceutical composition comprises 0.1 - 3 mg, 0.2 - 1.5 mg, or 0.4 to 0.9 mg of geraniol per dose.

[0104] Embodiment 62. The pharmaceutical composition of any one of embodiments 1-60, wherein the one or more terpenes comprise geraniol, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4

mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.2 mg, 2.5 mg, or 3 mg of geraniol per dose.

[0105] Embodiment 63. The pharmaceutical composition of any one of embodiments 1-60, wherein the one or more terpenes comprise geraniol, and wherein the pharmaceutical composition comprises 0.4 - 0.9 mg of geraniol per dose.

[0106] Embodiment 64. The pharmaceutical composition of any one of embodiments 1-63, wherein the one or more terpenes comprise guaiol, and wherein the pharmaceutical composition comprises 0.1 - 5 mg, 0.2 - 3.5 mg, or 0.4 to 3.2 mg of guaiol per dose.

[0107] Embodiment 65. The pharmaceutical composition of any one of embodiments 1-63, wherein the one or more terpenes comprise guaiol, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.2 mg, 2.4, 2.5 mg, 2.75, 3 mg, 3.2 mg, 3.5 mg, 4 mg, 4.5 mg, or 5 mg of guaiol per dose.

[0108] Embodiment 66. The pharmaceutical composition of any one of embodiments 1-63, wherein the one or more terpenes comprise guaiol, and wherein the pharmaceutical composition comprises 0.4 - 3.2 mg of guaiol per dose.

[0109] Embodiment 67. The pharmaceutical composition of any one of embodiments 1-66, wherein the one or more terpenes comprise α-bisobolol, and wherein the pharmaceutical composition comprises 0.1 - 3 mg, 0.2 - 1.5 mg, or 0.3 to 0.7 mg of α-bisobolol per dose.

[0110] Embodiment 68. The pharmaceutical composition of any one of embodiments 1-66, wherein the one or more terpenes comprise α-bisobolol, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.2 mg, 2.5 mg, or 3 mg of α-bisobolol per dose.

[0111] Embodiment 69. The pharmaceutical composition of any one of embodiments 1-66, wherein the one or more terpenes comprise α-bisobolol, and wherein the pharmaceutical composition comprises 0.3 - 0.7 mg of α-bisobolol per dose.

[0112] Embodiment 70. The pharmaceutical composition of any one of embodiments 1-69, wherein the one or more terpenes comprise 3-carene, and wherein the pharmaceutical composition comprises 0.1 - 3 mg, 0.2 - 1.5 mg, or 0.4 to 0.9 mg of 3-carene per dose.

[0113] Embodiment 71. The pharmaceutical composition of any one of embodiments 1-69, wherein the one or more terpenes comprise 3-carene, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.2 mg, 2.5 mg, or 3 mg of 3-carene per dose.

[0114] Embodiment 72. The pharmaceutical composition of any one of embodiments 1-69, wherein the one or more terpenes comprise 3-carene, and wherein the pharmaceutical composition comprises 0.4 - 0.9 mg of 3-carene per dose.

[0115] Embodiment 73. The pharmaceutical composition of any one of embodiments 1-72, wherein the one or more terpenes comprise β-pinene, and wherein the pharmaceutical composition comprises 0.1 - 5 mg, 0.3 - 3 mg, or 0.6 to 2.0 mg of β-pinene per dose.

[0116] Embodiment 74. The pharmaceutical composition of any one of embodiments 1-72, wherein the one or more terpenes comprise β-pinene, and wherein the pharmaceutical composition comprises about 0.1 mg, 0.2 mg, 0.3 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 0.9 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, 1.6 mg, 1.7 mg, 1.8 mg, 1.9 mg, 2 mg, 2.2 mg, 2.4, 2.5 mg, 2.75, 3 mg, 3.2 mg, 3.5 mg, 4 mg, 4.5 mg, or 5 mg of P-pinene per dose.

[0117] Embodiment 75. The pharmaceutical composition of any one of embodiments 1-72, wherein the one or more terpenes comprise β-pinene, and wherein the pharmaceutical composition comprises 0.6 - 2.0 mg of β-pinene per dose.

[0118] Embodiment 76. The pharmaceutical composition of any one of embodiments 1-75, wherein the one or more terpenes comprise γ-terpinene, and wherein the pharmaceutical composition comprises 0.05 - 1.6 mg, 0.1 - 0.8 mg, or 0.2 to 0.4 mg of γ-terpinene per dose.

[0119] Embodiment 77. The pharmaceutical composition of any one of embodiments 1-75, wherein the one or more terpenes comprise γ-terpinene, and wherein the pharmaceutical composition comprises about 0.05 mg, 0.06 mg, 0.07 mg, 0.08 mg, 0.09 mg, 0.1 mg, 0.11 mg, 0.12 mg, 0.13 mg, 0.14 mg, 0.15 mg, 0.16 mg, 0.17 mg, 0.18 mg, 0.19 mg, 0.20 mg, 0.21 mg, 0.22 mg, 0.23 mg, 0.24 mg, 0.25 mg, 0.26 mg, 0.27 mg, 0.28 mg, 0.29 mg, 0.3 mg, 0.31 mg, 0.32 mg, 0.33 mg, 0.34 mg, 0.35 mg, 0.36 mg, 0.37 mg, 0.38 mg, 0.39 mg, 0.4 mg, 0.45 mg, 0.5 mg, 0.55 mg, 0.6 mg, 0.75 mg, 1.0 mg, 1.1 mg, 1.2 mg, 1.3 mg, 1.4 mg, 1.5 mg, or 1.6 mg of γ-terpinene per dose.

[0120] Embodiment 78. The pharmaceutical composition of any one of embodiments 1-75, wherein the one or more terpenes comprise γ-terpinene, and wherein the pharmaceutical composition comprises 0.2 - 0.4 mg of γ-terpinene per dose.

[0121] Embodiment 79. The pharmaceutical composition of any one of embodiments 1-78, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, α-humulene, or a combination thereof; and wherein the pharmaceutical composition comprises about 30 - 60 mg of the β-mycene, about 2.5 - 5 mg of the β-caryophyllene, about 2.3 - 4.7 mg of the ocimene, about 1.1 - 2.1 mg of the α-pinene, about 0.8 - 1.6 mg of the α-humulene, or a combination thereof per dose.

[0122] Embodiment 80. The pharmaceutical composition of any one of embodiments 1-78, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, and α-humulene; and wherein the pharmaceutical composition comprises about 30 - 60 mg of the β-mycene, about 2.5 - 5 mg of the β-caryophyllene, about 2.3 - 4.7 mg of the ocimene, about 1.1 - 2.1 mg of the α-pinene, and about 0.8 - 1.6 mg of the α-humulene per dose.

[0123] Embodiment 81. The pharmaceutical composition of any one of embodiments 1-80, wherein the pharmaceutical composition is formulated as a liquid, a pill, a gel capsule, a vaporizable liquid, a vaporizable solid, a transdermal ointment or salve, or a transdermal patch.

[0124] Embodiment 82. The pharmaceutical composition of any one of embodiments 1-80, wherein the pharmaceutical composition is formulated as a liquid.

[0125] Embodiment 83. The pharmaceutical composition of embodiment 82, wherein the liquid comprises citric acid, blue agave, glycerine, one or more lorann oils, food coloring, or a combination thereof.

[0126] Embodiment 84. The pharmaceutical composition of embodiment 82, wherein the liquid comprises: (a) about 1% to 7% w/w citric acid; (b) about 40% to 49% w/w blue agave; (c) about 40% to 49% w/w glycerin; (d) about 0.1% to 1.5 % w/w lorann oils; (e) about 0.01 to 0.4% food coloring; (f) or a combination thereof.

[0127] Embodiment 85. The pharmaceutical composition of embodiment 82, wherein the liquid comprises: (a) about 1% to 7% w/w citric acid; (b) about 40% to 49% w/w blue agave; (c) about 40% to 49% w/w glycerin; (d) about 0.1% to 1.5 % w/w lorann oils; and (e) about 0.01 to 0.4% food coloring.

[0128] Embodiment 86. The pharmaceutical composition of embodiment 82, wherein the liquid comprises: (a) about 3 - 5% w/w citric acid; (b) about 45 - 49% w/w blue agave; (c) about 45 - 49% w/w glycerin; (d) about 0.7 - 0.9% w/w lorann oils; and (e) about 0.1 - 0.3% food coloring.

[0129] Embodiment 87. The pharmaceutical composition of any one of embodiments 1-86, for use in the treatment of opioid addiction.

[0130] Embodiment 88. The pharmaceutical composition of any one of embodiments 1-86, for use in the treatment of pain.

[0131] Embodiment 89. The pharmaceutical composition of any one of embodiments 1-86, for use in the treatment of chemotherapy-induced nausea and vomiting.

[0132] Embodiment 90. A method of treating opioid addition, the method comprising administering an effective amount of a pharmaceutical composition comprising one or more cannabinoids to a subject in need thereof.

[0133] Embodiment 91. The method of embodiment 90, wherein the pharmaceutical composition is the pharmaceutical composition of any one of embodiments 1-86.

[0134] Embodiment 92. The method of embodiment 90 or 91, wherein the pharmaceutical composition is administered every 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, or 24 hours.

[0135] Embodiment 93. The method of embodiment 90 or 91, wherein the pharmaceutical composition is administered every 6, 8 or 12 hours.

[0136] Embodiment 94. The method of any one of embodiment 90-93, wherein the subjects opioid use decreases by at least 50% within 5 weeks of beginning treatment as determined by morphine equivalency of opioids used.

EXAMPLE 1 - Exemplary formulation preparation

[0137] This example details the production of an exemplary cannabinoid formulation that can be used in the methods disclosed herein.

[0138] Briefly, 400 g citric acid, 5000 g blue agave, and 5000 g glycerin are mixed and heated to 150 °C. Separately, 300 g ethanol is heated and mixed with THC oil and CBD isolate until complete dissolution. Then, both mixtures are combined, flavoring (80 g Lorann Oils, e.g., watermellon, cherry) and coloring (20 g food coloring) are added, and the resulting mixture is sonicated until ingredients are thoroughly incorporated.

[0139] The final product is aliquoted to bottles, each containing about 5.5 oz. A single dose is about 12 mL.

[0140] The final product can contain, for example, about 15-20 mg THC and about 10-12 mg CBD per dose. The final product can also contain terpenes; for example, 30 - 60 mg β-myrcene (e.g., about 45 mg), 2.5-5 mg β-caryophyllene (e.g., about 3.7 mg), 2.3-4.7 mg ocimene (e.g., aobut 3.5), 1.1-2.1 mg α-pinene (e.g., about 1.6), 0.8-1.6 mg α-humulene (e.g, about 1.2 mg), or a combination thereof. Table 2 contains an exemplary recipe.

Table 2 - Exemplary formulation recipe

Batch Size: 10,000 g **16 g formulation = 12 mL volume = 1 dose**				
Component	**Amount Added**	**Percent by Weight**	**mg / g**	**mg / dose**
Carriers/Excipients				
Citric Acid	393.27 g	3.933%		
Blue Agave	4729.13 g	47.291%		
Glycerine	4729.13 g	47.291%		
Flavor: Lorann Oils	78.65 g	0.787%		
Food Coloring	19.66 g	0.197%		
Cannabinoids				
THC	9.38g	0.094%	0.9375 mg/g	15 mg/dose
CBD	6.25 g	0.063%	0.625 mg/g	10 mg/dose
Terpenes				
β-myrcene	28.13 g	0.281%	2.8125 mg/g	45 mg/dose
β-Caryophyllene	2.31 g	0.023%	0.23125 mg/g	3.7 mg/dose
Ocimene	2.19 g	0.022%	0.21875 mg/g	3.5 mg/dose
α-pinene	1.00 g	0.010%	0.1 mg/g	1.6 mg/dose
α-humulene	0.75 g	0.008%	0.075 mg/g	1.2 mg/dose

EXAMPLE 2

[0141] Over the last 150 years the perceived and reported medicinal effects or benefits associated with the consumption of products derived from the cannabis plant have fluctuated as much as the most volatile stock market period in history. Periodically, the benefits have been held out to be Olympian in nature, virtually a cure all for all conditions while at other times use of the cannabis has been associated with "reefer madness"; including suicidal ideation, sexual promiscuity, and in general uncontrolled impulses. The truth, as usual lies somewhere in between. Add in a dose of world politics and posturing; difficulty in conducting trials; an error in taxonomy; the radically different effect ascribed to the two main components of the plant, Delta-9 tetrahydrocannabinol (THC) and Cannabidiol (CBD) consumed in a variety of ways; a less than clear understanding of the metabolism of the compounds and the endocannabinoid system; and the inability to link a specific plant profile to a specific outcome have all made it even more difficult in separating the flower from the trim, as it pertains to cannabis sativa and its medicinal effects.

[0142] For the purposes of this forum the historic marketing of cannabis and its byproducts will be left to an excellent reference as will references to reefer madness type publications. Regarding world and US politics, our present-day situation, for the most part, is governed nationally by the Nixon administration ignoring the recommendations of the National Commission of Marihuana and Drug Abuse (The Schafer Commission) and its appendix both published in 1972, which overall called for decriminalization of personal possession and use of cannabis. Even this report was not without controversy. To paraphrase a report issued by the Committee on Public Health of the New York Academy of Medicine, it recommended that a government agency investigate the feasibility of control and distribution of marihuana through a government agency, while a New England Journal editorial suggested that legalization offered the best promise for effective control of marihuana. Nahas and Greenwood published a detailed rebuttal to the Shafer Commission report and ultimately the administration ignored the Commission's recommendations. Currently 28 states, the District of Columbia and a few of the over 500 recognized Indian tribal nations have passed laws regulating the sale of cannabis either for medical or both medical and recreational use and the laws enacted by each of these government(s) or their legislation are at odds with federal statute. The recent rescinding of the Cole memorandum by Attorney General Sessions has added fuel to the fires of confusion which unfortunately will not be solved here but all should be left with the warning of "buyer beware".

[0143] Now onto the science. Like staging systems for each cancer, we can all argue the merits of the specifics defining

each stage, but none would argue against the need for uniformity. For without it, discussion of results and therefore evaluation of new treatments would be rendered impossible. Cannabis, was taxonomically divided into three species in the 1970s; C. indica, C. sativa, and C. ruderalis. Adding to the confusion, yet ultimately clarifying was the work of McPartland wherein he proved on a genetic basis that these were all the same species, just different subspecies. More importantly he found that C. sativa originated in India and should have been classified as C. indica; C. indica originated in Afghanistan and should have been identified as C. afghanica; and C. ruderalis is most properly classified as C. sativa. Until this nomenclature is standardized comparing research results will be near impossible.

[0144] Since Mechooulam's group identified and synthesized both cannabidiol (CBD) and delta-9 tetrahydrocannabinol (THC) the psychoactive component in the cannabis plant there have been over 60 phytocannabinoids the identified in addition to approximately 400 other components of the cannabis plant including a large number of terpenes that account for the associated aroma and may contribute to the entourage effects of cannabis. Research efforts have logically been based upon our understanding of the cannabinoid receptors so far identified throughout the body, but particularly in the brain and metabolism via the cytochrome P450 pathways. Left to further study is the molecular basis for the therapeutic effect of associated with cannabidiol (CBD) as it has little affinity for the CB1 and CB2 receptors. Of most importance at this time has been the identification of CBD acting as a negative allosteric modulator thereby changing the shape of the CB1 receptor and thus dampens the psychoactive effect associated with the consumption of THC when taken in combination with CBD.

[0145] Much of our collective knowledge regarding the clinical effects of cannibinoids arises from case reports and observational and retrospective studies. There are few prospective randomized trials reported. Many that pertain to clinical oncology involve the use of dronabinol for the relief of chemotherapy-induced nausea and vomiting and pain. May and Giode have thoroughly reviewed much of this literature. Dronabinol has offered little relief over available anti-emetic regimens. Additional prospective studies have been conducted using oromucosal nabiximols (THC:CBD of 1:1) for intractable spasticity in patients with multiple sclerosis (MS) and those results led to the FDA ultimately granting GW Pharmaceuticals (London UK, Carlsbad CA) approval for this indication. Trials using the same product, designed to determine its effectiveness in cancer-associated pain, was not found to be better than placebo. Maccarrone et al have reviewed results of trials involving oromucosal nabiximols. Russo similarly has provided an excellent review on the matter of trial design and other controversies associated with research in this area, including issues involving clinical trial approval and design. Highlighted by Russo are the difficulties encountered when attempting to undertake research involving cannabis, in particular the need to either use cannabis provided exclusively by the University of Mississippi or apply to cultivate and supply your study drug.

[0146] In Nevada, efforts to conduct federally-approved research undertaken with the intent of filing a new drug application a has been thwarted as the Institutional Review Board (IRB) at the University Medical Center (UMC) requires DEA assurance before considering any protocol containing cannabis in a treatment arm, yet to obtain federal permission one needs IRB approval of the study of concern.

[0147] Addressing the opiate crisis in this country has led to a number of studies being conducted using cannabis-based therapy as an alternative means of managing chronic and cancer-related pain. Despite Nabiximols not appearing to be statistically superior when compared to placebo in controlling pain in cancer patients, there are other randomized placebo controlled trials demonstrating the efficacy of using cannabis for pain control. There is also significant evidence that a cannabis-opioid interaction exists that results in improved pain control. All of the studies to date have either used pain scales or patient interview results to determine the success or failure of the cannabis intervention. Given the increasing availability of legal cannabis, there will be fewer opportunities to study a cannabis naive population use as it is clear from the work of Bachhuber et al. that patients are self-treating with cannabis in order to reduce if not eliminate their dependence on narcotics. This is reflected by the 24% reduction in opiate-related deaths in states with legalized medical marijuana programs as compared to those without.

[0148] We, a group of physicians in Nevada, are licensed to cultivate, produce and sell cannabis-related products and have recently undertaken a randomized, placebo controlled study using a guava-based syrup with a THC:CBD ratio of about 2:1 and a placebo containing only the flavored guava-based syrup. As a proof of concept 25 patients with a history of at least 3 years of chronic opiate use were enrolled in a single arm study with the endpoint being a 30% reduction of opiate intake determined by weekly pill count.

[0149] The population of subjects in this study included 14 women and 11 men.. The average age of participants was about 55 years old, with the youngest being 21 and the oldest being 77. The median age was about 58 years old. According to their medical histories, 4 participants had a history of gynecologic or breast cancer; 11 participants have had spine surgery; 5 participants have had a hysterectomy; 4 participants reported hypertension; 2 participants reported coronary artery disease, 2 participants had diabetes; 11 participants used tobaco; 6 participants used alcohol; and 3 participants reported drug abuse.

[0150] A morphine equivalent calculation was adopted for this study to account for the varying opiates used by the study participants. Hydrocodone alone was used by 9 participants; hydrocodone plus morphine sulfate was used by 1 participant; hydromorphone alone was used by 2 participants; hydromorphone plus methadone was used by 1 participant;

oxycodone alone was used by 6 participants; oxycodone plus methadone was used by 1 participant; oxycodone plus morphine sulfate was used by 2 participants; and Percocet was used by 3 participants.

[0151] 23 of the 25 patients reduced their opiate intake by greater than 50%. The average weekly pill count is charted in Fig. 1a with regression analysis shown in Fig. 1b. The average weekly pill counts after conversion to morphine equivalents is shown in Fig. 2a with regression analysis shown in Fig. 2b. These results provide an objective basis to evaluate the potential of cannabis to replace to reduce the opiate consumption across the US. We have also opened a trial to evaluate the effectiveness of this syrup with some slight modifications in the terpene profile, in controlling chemotherapy- induced nausea and vomiting (CINV).

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EXAMPLE 3 A Phase III Double-Blind, Randomized, Placebo Controlled (with crossover) Trial of Medical Marijuana Versus Placebo for the Reduction of Opiate Consumption in Patients with Chronic Pain

Schema

[0153]

Arm I: Placebo	Arm II: THC/CBD (strain specific)
•If no improvement ↓ Double the Dose ↓ •If no improvement, Cross-over to Arm II	•If no improvement ↓ Double the Dose ↓ •If no improvement, Cross-over to Arm I

OBJECTIVES

[0154] ***Primary Objective:*** To determine if the number of patients consuming opiates for chronic pain treate d with medicinal cannabis (15-20 mg THC/ 10-12mg CBD- strain specific) in an agave-based syrup that are able to eliminate their opiate consumption is not reduced by 300% when compared to an identical agave-based syrup without cannabis.
[0155] ***Secondary Objective:*** To determine the incidence of adverse events associated with both regimens. Common Terminology for Adverse Events (CTAE ver. 4) will be used to scale adverse events.

BACKGROUND AND RATIONALE

[0156] The available literature on the medicinal effects of cannabis is sparse and for the most part lacks critical aspects of study design including prospective design and randomization. The reasons for this are varied, but primarily they are based on the fact that cannabis remains a schedule 1 drug and its production and ingestion are against federal law. Most studies have evaluated synthetics, nabilone or dronabinol, with few evaluating THC derived from plant. Internationally, over 30 countries have approved its use either recreationally or medicinally. Some countries such as Paraguay and Chile have legalized cultivation and production of cannabis products. Over half of the states and the District of Columbia have legalized the use of cannabis medicinally and some have approved its use recreationally. In the last few years, research into the underlying neurophysiology associated with cannabis has led to an increased understanding of the different active components and the biochemical pathways responsible for the associated therapeutic effects. The constituents seemingly responsible for the claimed medicinal effects of the cannabis plant can include delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD).
[0157] The purported beneficial medicinal effects associated with cannabis ingestion are quite diverse. Of the claims made, the most studied are in patients with multiple sclerosis, where a beneficial effect on muscle spasticity and pain are well-documented, but not necessarily as consistently as one might like. Cannabis can also be effective in treating seizures, anorexia, chronic pain, and nausea and vomiting that is associated with chemotherapy. Cannabidiols may also have a therapeutic effect of inflammation, diabetes, cancer, and neurodegenerative diseases. On the other hand THC ingestion has been associated with less than desirable side effects such as agitation; panic disorder; depression and even psychosis.
[0158] Perhaps as importantly, the political landscape is changing as rapidly as is the understanding of the underlying mechanisms of action associated with cannabis. Indications of this are the increasing number of states that have legalized the medicinal use of cannabis and the call by some states, such as Nevada, to undertake research to evaluate the clinical benefits associated with the use of cannabis.
[0159] The opiate epidemic continues to be associated with over 100 deaths daily in the United States. Couple this with the estimated total annual cost of pain-related health of approximately $600 billion and perhaps this figure is even higher for the nations in European Union (EU) and therein is born the impetus to evaluate virtually any therapy that may thwart these related problems. This estimate includes the actual costs related to the medical care as well as the economic losses which contribute to approximately one-half of these costs. Economic losses include claimed disability, loss of productivity and lost wages. Medical care including physician time, hospitalization, surgical procedures, diagnostic testing and prescription drugs all contribute to the costs associated with the treatment of pain, as well the costs associated with the adverse effects associated with their utilization. Unfortunately, one of the adverse effects associated with prescription painkillers is death. Overdose deaths secondary to prescription opioids were five times higher in 2016 than 2000 and sales of these prescription drugs have quadrupled. That being said, the number of deaths dues to prescription opioids

has remained relative stable at approximately 14,000 to 16,000 deaths per year. Much of the increase in mortality related to opioid consumption is due the rapid rise in those associated with the use of synthetic opioids. Of importance is the fact that in state with either medical marijuana or both medical and retail marijuana programs in place there was a 24.8% lower mean annual opiod overdose mortality rate (95%CI, -37.5% to -9.5%: P=.003) compared with states without medical marijuana laws.

[0160] Addressing the opiate crisis in this country has led to a number of studies being conducted using cannabis-based therapy as an alternative means of managing chronic and cancer-related pain. Despite Nabiximols not appearing to be superior when compared to placebo in controlling pain in cancer patients, cannabis may have efficacy for pain control. A cannabis-opioid interaction may also result in improved pain control.

[0161] Cannabis contains at least 63 cannabinoids but two are best understood studied. The first, delta-9 tetrahydrocannabinol (THC), is thought to be responsible for the psychoactive effects that are widely associated with cannabis. The other main active component, cannabidiol (CBD), has no known psychoactive effect associated with its consumption but is thought to possibly provide anti-neoplastic, analgesic and antineuroleptic effects. Even though both cannabinoids are present in every plant, the interactions with the cerebral endocannabinoid receptor system are quite different. CBD binds as an antagonist to the cannabinoid receptor CB1 but the bond between THC and the same receptor is at least 100 times stronger. CBD also antagonizes the action on the cannabinoid G protein-coupled receptor GPR55, which is thought to be responsible the different neuromodulatory actions as the CB1 receptor. Claims of the subjective effects associated with cannabis ingestion include improvement in mood; relaxation; and increased sensitivity. On the other hand THC ingestion has been associated with less than desirable adverse effects such as agitation; panic disorder; depression and even psychosis.

[0162] Cannabinoids can have an effect on serotonergic systems, including increasing cerebral production of 5-hydroxytryptamine (5-HT), serotonin while decreasing its uptake at the synapse level. THC may also have dopaminergic antagonistic actions which may contribute to its beneficial profile regarding pain control.

[0163] Other phytocannabinoids such as cannabichromene (CBC), cannabigerol (CBG) as well as a number of terpenoids may contribute its analgesic effect. CBD, cannabinol (CBN),CBC and CBG can have anti-inflammatory and analgesic effects over and beyond that associated with THC. B-caryophyllene may be a selective CB2 agonist and other terpenes such as linalool and a-Pinene may have analgesic and anti-inflamatory effects respectively. Myrcene on the other hand may have analgesic effects mediated through an opioid-like action. This may lead to another avenue as to how cannabis and it component parts may prevent opiate withdrawal and allow for the use of lesser amounts of opioids while preventing the development of tolerance. Used in combination with opioid pain medications, cannabis can lower opioid side effects, cravings, and withdrawal severity, as well as enhance the analgesic effects of opioids, thereby allowing for lower doses and less risk of overdose.

[0164] All of the studies to date have either used pain scales or patient interview results to determine the success or failure of the cannabis intervention.

[0165] We have recently undertaken a phase II feasibility trial using a guava-based syrup with a THC:CBD ratio of 1.5: 1 to 2:1 derived from a specific cannabis plant with a unique profile of other phytocannabinoids such as CBC, CBN, and CBG as well as a number of terpenoids which likely contribute to its analgesic effect. Each dose of syrup contained 15-20 mg of THC and 10-12 mg of CBD as well as a unique profile associated with one specifically bred cannabis plant. A proof of concept trial of 25 patients with a history of at least 3 years of chronic opiate use were enrolled in a single arm study with the target for success being a 30% reduction of opiate intake determined by weekly pill count. Using a morphine equivalent conversion of all of the various opiates consumed by the study population it was determined that there was a reduction in opiate consumption of approximately 75% and 8/25 patients (40%) were able to replace their prescription opiates with the agave-based THC-CBD syrup. This provides an objective basis to evaluate the potential of cannabis to reduce if not eliminate a significant amount of the opiate consumption across the US. As explained above the actions of THC, CBD, and associated terpenes are potentially complementary and the recent feasibility trial provides substantial evidence of potential benefit of using them together for patients with chronic pain.

[0166] That being said another important consideration in administering cannabis to patients is the potential drug- to -drug interactions and adverse effects associated with its use and potential withdrawal. THC is metabolized via the Cytochrome P450 pathway and more specifically it is thought that the CYP2C9 enzyme is responsible for the first pass metabolism of THC. The CYP3A4 enzyme may also have a role in its metabolism. Coumadin effect on prothrombin time (PT) is significantly enhanced by the use of THC/CBD. Theophylline levels may be adversely affected. There have been reported adverse events when cannabis is used with sildenafil, including a myocardial infarction. Since THC is a CNS depressant its use with alcohol, barbiturates, antihistamines, narcotics, and BZD, theoretically could amplify the effects of both drugs. It should be noted there has not been any clinical trial documenting these interactions. Similarly, adverse events need to be carefully documented. In this context cannabinoid receptors are not located in the brainstem as are opioid receptors and therefore do not have the associated risk of respiratory depression and death. Adverse effects including, but not limited to tachycardia and hypotension, anxiety and nervousness, hyperactivity, muscle relaxation, decreased bowel motility, and bronchodilatation have been documented.

[0167] The addictive potential of cannabinoids is thought to be lower than opiates and its derivatives as well as other frequently abused substances. Interestingly, as cannabinoids are stored in adipose, excretion takes place over a relatively long-time thus preventing precipitous declines in the plasma concentration and potentially explaining the lack of acute withdrawal symptoms associated with the cessation of cannabis use. Nevertheless, there have been documented symptoms associated with withdrawal including, but not limited to, nausea and vomiting, increased activity, nervousness, irritability, insomnia, and vasomotor symptoms.

[0168] This overall safety profile of the cannabinoids made them an excellent candidate to be studied as an opiate substitute. A recently completed pilot study demonstrated in 25 patients, a 75% reduction in opiate ingestion over a 4-5 week period, with 8/25 patients completely discontinuing their opiate use. The same formulation used in that study will be studied here.

Inclusion of Women and Minorities

[0169] No potential subject will be excluded from participating in this or any study solely on the basis of ethnic origin or socioeconomic status. Every attempt will be made to enter all eligible patients into this protocol and therefore address the study objectives in a patient population representative of the entire population currently consuming opiates for over three years.

PATIENT ELIGIBILITY AND EXCLUSIONS

Eligible Patients Criteria

[0170]

1) Patients currently consuming opiates chronically for a minimum of 3 years.
2) Patients who can read understand and write English or have a translator available to do so.
3) Patients who are able to complete the assessments.
4) Patients who are able to comply with treatment regimen and be seen on a weekly basis at the study site to have their medications counted and an assessment completed.
5) Patient must hold a valid Nevada Medical Marijuana Card or be qualified by reciprocity as defined by Nevada Statute.

Ineligible Patients Criteria

[0171]

1) Patients who, in the opinion of their physician, have any condition that may contradict potential withdrawal symptoms associated potential reduction of opiate ingestion,
2) Patients known to have had a hypersensitivity reaction to any of the drugs to be received as part of this trial.
3) Patients currently taking warfarin or similar products.
4) Patients taking Tadalafil (Cialis TM), Sildenafil (Viagra), or Theophylline.
5) Pregnant patients or patients on oral contraceptives who are not willing to use another form of back up birth control in addition to the pill.
6) Patients who have used cannabis within the last one month.

STUDY MODALITIES

[0172] Tetrahydrocannabinol: Cannabidiol (THC:CBD) agave based syrup (20 mg THC/10 mg CBD) vs control agave-based syrup.

[0173] Each bottle will contain either 150- 200 mg: 100-120 mg (THC:CBD) in an agave based syrup with reconstituted terpene profile or the agave- based syrup alone. The emulsification process renders the material virtually odorless allowing for the patient to be blinded.

[0174] Storage and Stability: store vials at 2-8°C (36-46°F).

[0175] Preparation: emulsified solution.

[0176] How Supplied: in glass jars with increments and doses labeled on each bottle.

[0177] Administration: both are to be administered on a q6 to q8 hour basis (e.g., every 6 to 8 hours) by either direct administration or the syrup is to be mixed with 7-up with care being taken to chew the ice. If ineffective, the patient will double the dose. If there is no improvement then the patient will be crossed-over.

[0178] Adverse Events: THC ingestion has been associated with adverse effects such as agitation; panic disorder; depression and even psychosis and all adverse events will be chronicled based on version 4.

Cannabis

Description:

[0179] Tetrahydrocannabinol: Cannabidiol (THC:CBD) agave based syrup (15-20 mg THC/10-12 mg CBD) with re-constituted terpene profile versus control agave-based syrup.

[0180] Cannabis is intended for use as a psychoactive drug or as a medicine. The main psychoactive part of cannabis is tetrahydrocannabinol (THC); it is one of at least 421 known compounds in the plant, including at least 61 other cannabinoids, such as cannabidiol (CBD), cannabinol (CBN), and tetrahydrocannabivarin (THCV).

[0181] Researchers have subsequently confirmed that THC exerts its most prominent effects via its actions on two types of cannabinoid receptors, the CB1 receptor and the CB2 receptor, both of which are G-protein coupled receptors. The CB1 receptor is found primarily in the brain as well as in some peripheral tissues, and the CB2 receptor is found primarily in peripheral tissues, but is also expressed in neuroglial cells THC appears to alter mood and cognition through its agonist actions on the CB1 receptors, which inhibit a secondary messenger system (adenylate cyclase) in a dose dependent manner. These actions can be blocked by the selective CB 1 receptor antagonist SR141716A (rimonabant), which has been shown in clinical trials to be an effective treatment for smoking cessation, weight loss, and as a means of controlling or reducing metabolic syndrome risk factors. However, due to the dysphoric effect of CB1 antagonists, this drug is often discontinued due to these side effects. Via CB1 activation, THC indirectly increases dopamine release and produces psychotropic effects. Cannabidiol also acts as an allosteric modulator of the mu and delta opioid receptors. THC also potentiates the effects of the glycine receptors. The role of these interactions in the "marijuana high" remains elusive.

[0182] The high lipid-solubility of cannabinoids results in their persisting in the body for long periods of time. Even after a single administration of THC, detectable levels of THC can be found in the body for weeks or longer (depending on the amount administered and the sensitivity of the assessment method). A number of investigators have suggested that this is an important factor in marijuana's effects, perhaps because cannabinoids may accumulate in the body, particularly in the lipid membranes of neurons.

[0183] In comparison to smoking and inhalation, after oral ingestion, systemic absorption is relatively slow resulting in maximum ∆9-THC plasma concentration within 1-2 hours which could be delayed by few hours in certain cases. In some subjects, more than one plasma peak was observed. Extensive liver metabolism probably reduces the oral bioavailability of ∆9-THC by 4-12%. After oral administration, maximum ∆9-THC plasma concentration was 4.4-11 ng/mL for 20 mg and 2.7-6.3 ng/mL for 15 mg. Much higher concentration of 11-OH THC was produced after ingestion than inhalation. Following assimilation via the blood, ∆9-THC rapidly penetrates in to fat tissues and highly vascularized tissues including brain and muscle resulting in rapid decrease in plasma concentration. This tissue distribution is followed by slow redistribution of it from the deep fat deposits back into the blood stream. It should be noted that the residual ∆9-THC levels are maintained in the body for a long time following abuse. The half- life of it for an infrequent user is 1.3 days and for frequent users 5-13 days. After smoking a cigarette containing 16-34 mg of ∆9-THC, THC-COOH is detectable in plasma for 2-7 days. A clinical study carried out among 52 volunteers showed that THC-COOH was detectable in serum from 3.5 to 74.3 hours. Initial concentration was between 14-49 ng/mL. This was considerably less than the THC-COOH detection time of 25 days in a single chronic user.

[0184] ∆9-THC is metabolized in the liver by microsomal hydroxylation and oxidation catalyzed by enzymes of cytochrome P450 (CYP) complex. The average plasma clearance rates have been reported to be 11.8± 3 L/hour for women and 14.9 ±3.7 L/hour for men. Others have determined approximately 36 L/hour for naïve cannabis users and 60 L/hour for regular cannabis users. More than 65% of cannabis is excreted in the feces and approximately 20% is excreted in urine. Most of the cannabis (80-90%) is excreted within 5 days as hydroxylated and carboxylated metabolites. There are eighteen acidic metabolites of cannabis identified in urine and most of these metabolites form a conjugate with glucuronic acid, which increases its water solubility. Among the major metabolites (∆9-THC,11-OH-THC, and THC-COOH), THCCOOH is the primary glucuronide conjugate in urine, while 11-OH-THC is the predominant form in feces. Since ∆9-THC is extremely soluble in lipids, it results in tubular re-absorption, leading to low renal excretion of unchanged drug. Urinary excretion half- life of THCCOOH was observed to be approximately 30 hours after seven days and 44-60 hours after twelve days of monitoring. After smoking approximately 27 mg of ∆9-THC in a cigarette, 11-OH-THC peak concentration was observed in the urine within two hours in the range of 3.2-53.3 ng/mL, peaking at 77.0±329.7 ng/mL after 3 hours and THCCOOH peaking at 179.4ng/mL± 146.9 after 4 hours.

Stability and Storage

[0185] Store at room temperature in a colored bottle to avoid decomposition of the THC.

Preparation

[0186] The syrup is prepared using CO2 extracted THC which is then decarboxylated. The syrup is composed of agave syrup, glycerin, citric acid, lecithin, THC/CBD oil, coloring and flavoring. Each bottle, marked on the sides in 12 millimeter increments, will contain a total of 150-200 mg of THC and approximately 100-120mg of CBD and will provide ten doses of medicine. The placebo will be the identical mixture without the addition of THC/CBD oil.

Administration

[0187] The patient will ingest 12 ml of either placebo or medicinal cannabis containing approximately 15-20 mg of THC and 10-12mg CBD with the plant-specific terpenes reconsituted on a QID basis. The patients will be allowed to double the dose if symptoms to do not resolve.

Adverse Events

[0188] Short-term adverse effects include alterations in short-term memory, sense of time, sensory perception, attention span, problem solving, verbal fluency, reaction time, and psychomotor control. Some users report positive feelings such as mild euphoria and relaxation, while others, particularly naive users, report anxiety, paranoia, and panic reactions. Depression and anxiety have also been reported as short-term adverse events. The short-term effects of marijuana last approximately 1-4 hours, depending on potency of the marijuana, the route of administration, and the tolerance of the user. Furthermore, there have been reports of adverse cardiac events including arrhythmias associated with a prolonged Q-T interval; hypertension and hypotension; tachycardia; and myocardial infarction. It is much more difficult to assess long-term adverse effects that may be attributable to the consumption of medicinal cannabis. While there is no question that marijuana causes short-term impairments in brain function, the degree to which these impairments are reversible with chronic use is less clear. Some studies have shown that brain function recovers over time, while others demonstrate persistence of subtle, but important, impairments. There is some suggestion that schizophrenia may be associated with long-term usage of cannabis. Lastly, there are the general concerns of smoking associated with cannabis use although that is not of concern as it relates to this study as the cannabis will be ingested and not inhaled.

Drug Interactions

[0189] Δ 9-THC is metabolized in the liver by microsomal hydroxylation and oxidation catalyzed by enzymes of cytochrome P450 (CYP) complex. As a result any drug that is similarly metabolized may be affected. Particular attention must be given to warfarin or similar products; tadalafil or similar products; and anti-depressants.

TREATMENT PLAN AND ENTRY

IRB approval and IRB-approved informed consent

Patient Entry and Registration

Treatment Plan

[0190] This is a double-blind phase III prospective randomized two-arm study which will be conducted in patients with chronic pain with a history of at least 3 years use of opiates for analgesia. Patients will be randomized using a computer based randomization program off-site and overseen by the independent observer. Patients will start the study within 2 days of filling their opiate prescription and verification through the Nevada State Prescription Monitoring Program that the patient is receiving narcotics from only a single source. The total morphine milligram equivalents (MME) used weekly by the subject will be calculated based on the CDC conversion table. Subjects will be given a diary to record time and amount of study medication used on a daily basis in addition to recording any adverse events. Diaries will be collected weekly. Patients will be given physician phone number in order to report any adverse event.

[0191] *Week* 1. Patients are to use syrup (A or B) as directed on a η 6 hour basis and use their opiates only for breakthrough pain.. The patient will be seen at the end of each week and a pill count will be done to determine the quantity of opiate (MME) consumed by the subject and recorded.

[0192] *Weeks 2-7.* At the end of week 2 if there has been no improvement as determined by at least a 20% reduction in total MME used compared to the baseline, the patient will crossed over and continued on the new syrup for a minimum of two additional weeks and if no reduction of at least 20% in total MME study treatment will be discontinued. If the patient's consumption of MME decreases by more than 20% within the first two weeks after initial drug assignment or after two weeks after being crossed-over, the patient will continue on the study drug for at least 4 additional weeks. The patient will be followed through the end of the study with collection of all study data.

TREATMENT MODIFICATIONS

[0193] Before cross-over has taken place if there is no improvement from the patient's baseline assessment the dose of either the placebo or THC/CBD will be doubled. Within two weeks after cross-over should the total MME used not decrease by at least 20% the subject will be recorded as a failure of study treatment.

STUDY PARAMETERS

Observations and Tests

[0194] The following observations and tests are to be performed and recorded on the appropriate form(s):

PARAMETER	Baseline or Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Days 8, 15, 22, 29, 36, 43
History & Physical	1							
Medication diary	X**	X	X	X	X	X	X	2
Pill count and MME calculation	X**	X	X	X	X	X	X	2
Gen Chemistry Panel: Electrolytes: CBC c diff: PT/INR	1							3
Toxicity Diary & Assessment	X	X	X	X	X	X	X	2

1. The baseline History and Physical done will be used if performed within 30 days of entry.
2. Patients will return the Medication Diary weekly. The toxicity assessment will be completed daily by the patient and tabulated weekly unless grade 3 or greater toxicity occurs.
3. Additional blood work will be ordered by the treating physician as needed.

EVALUATION CRITERIA

[0195] The MME calculated at study entry, weekly and then at completion will be used to determine treatment course as well as the success or failure of the study drug.

[0196] The patients will complete a daily medication and toxicity diary and will be assessed weekly.

Parameters of Response

[0197] Amount of opiate consumed by pill count and MME will be recorded in the medication diary and by the physicians conducting the study. The primary outcome is the complete elimination of opiate used to control the subject's symptoms.

[0198] Secondary outcome is the percentage reduction of opiate usesd to control the subject's symptoms as measured by pill count and MME.

[0199] Adverse events will be documented by the study subjects and verified by the physicians conducting the study

DURATION OF STUDY

[0200] The duration of the study will be 4 weeks at a minimum unless subject withdraws voluntarily or is caused to withdraw secondary to an adverse event deemed severe enough either by the patient or treating physician to warrant the subject's withdrawal from the protocol prescribed treatment plan.

STUDY MONITORING AND REPORTING PROCEDURES

Adverse Event Reporting For A Commercial Agent

Definition of Adverse Events (AE)

[0201] An adverse event (AE) is any unfavorable and unintended sign (including an abnormal laboratory finding), symptom, or disease that occurs in a patient administered a medical treatment, whether the event is considered related or unrelated to the medical treatment. The descriptions and grading scales found in the revised NCI Common Terminology Criteria for Adverse Events (CTCAE) version 4.0 will be utilized for AE reporting. All appropriate treatment areas should have access to a copy of the CTCAE version 4.0.

Definition of Serious Adverse Event (SAE)

[0202] A Serious Adverse Event (SAE) is defined as any untoward medical occurrence that at any dose:

1. Results in death
2. Is life threatening (i.e., the subject was, in the opinion of the investigator, at immediate risk of death from the event as it occurred); it does not refer to an event which hypothetically might have caused death if it were more severe
3. Requires or prolongs inpatient hospitalization
4. Results in persistent or significant disability/incapacity (i.e., the event causes a substantial disruption of a person's ability to conduct normal life functions)
5. Results in a congenital anomaly/birth defect
6. Requires intervention to prevent permanent impairment or damage
7. Is an important and significant medical event that may not be immediately life threatening or resulting in death or hospitalization but, based upon appropriate medical judgment, may jeopardize the patient/subject or may require intervention to prevent one of the other outcomes listed above.

Reporting Expedited Adverse Events

[0203] An AE report may need to reach multiple destinations. All expedited AEs will be reported to the IRB or the supervising body overseeing this study. Reporting will be modeled after AdEERS submissions. All adverse reactions will be immediately directed to the Study Chair for further action.

[0204] Note: All deaths on study require both routine and expedited reporting regardless of causality. Attribution to treatment or other cause must be provided.

Expedited AE reporting time lines defined:

[0205] "24 hours; 3 calendar days" - The investigator must initially report the AE within 24 hours of learning of the event followed by a complete report within 3 calendar days of the initial 24-hour report.

[0206] "7 calendar days" - A complete report on the AE must be submitted within 7 calendar days of the investigator learning of the event. Any medical event equivalent to CTCAE grade 3, 4, or 5 that hospitalization (or prolongation of existing hospitalization) must be reported regardless of attribution and designation as expected or unexpected with the exception of any events identified as protocol- specific expedited adverse event reporting exclusions.

[0207] AEs should be reported by the investigator.

Pilot Trials Utilizing a Commercial Agent: AdEERS Expedited Reporting Requirements for Adverse Events That Occur Within 30 Days of the Last Dose of Any Study Agent

[0208] Reporting Requirements for Adverse Events that occur within 30 Days of the Last Dose of the Commercial Agent on Pilot Trials - GUIDELINES TO BE FOLLOWED regarding reporting of AEs to the Principal Investigator and the IRB

	Grade 1	Grade 2	Grade 2	Grade 3		Grade 3		Grades 4 & 5[2]	brades 4 & 5[2]
	Unexpected and Expected	Unexpected	Expected	**Unexpected** With Hospitalization Without Hospitalization		**Expected** With Hospitalization Without Hospitalization		Unexpected	Expected
Unrelated Unlikely	Not Required	Not Required	Not Required	7 Calendar Days	Not Required	7 Calendar Days	Not Required	7 Calendar Days	7 Calendar Days
Possible Probable Definite	Not Required	7 Calendar Days	Not Required	7 Calendar Days	7 Calendar Days	7 Calendar Days	Not Required	24-Hrs; 3 Calendar Days	7 Calendar Days

[1] Adverse events with attribution of possible, probable, or definite that occur greater than 30 days after the last dose of treatment with a commercial agent require reporting as follows:

AdEERS 24-hour notification followed by complete report within 3 calendar days for: Grade 4 and Grade 5unexpected events

AdEERS 7 calendar day report:.Grade 3 unexpected events with hospitalization or prolongation of hospitalization and Grade 5 expected events

[2] Although an AdEERS 24-hour notification is not required for death clearly related to progressive disease, a full report is required as outlined in the table.

Please see exceptions below under the section entitled, "Additional Instructions or Exceptions to AdEERS Expedited Reporting Requirements for Pilot Trials Utilizing a Commercial Agent." March 2005

[0209] Any event that results in persistent or significant disabilities/incapacities, congenital anomalies, or birth defects must be reported to the Study Chair if the event occurs following treatment with a commercial agent.

[0210] Additional Instructions or Exceptions to AdEERS Expedited Reporting Requirements for Pilot Trials Utilizing a Commercial Agent will be applied to this study:

[0211] In rare cases, pregnancy might occur in clinical trials. Any pregnancy occurring in association with the use of the study medication and the pregnancy outcome must be reported within five days of first awareness.

[0212] The event of overdose of aprepitant is considered an SAE by the manufacturer. In the event that there is an overdose of aprepitant, report the overdose and any clinical consequences that occur in association with an overdose.

Procedures for Expedited Adverse Event Reporting:

[0213] Expedited Reports: Expedited reports are to be submitted to the study Chair and the IRB using reports similar to the AdEERS.

DATA MANAGEMENT FORMS

[0214] The following forms must be completed for all patients and must be received in the study office in accordance with the schedule below.

Form±	Due within		Copies*	Comments
	Weeks	Event		
History and Physical[1]	4	Registration	1	
Consent	4	Regi strati om	1	Submit to study co-ordinator
Patient Symptom Diary	4	weekly	1	Submit to study co-ordinator
Pill count and MME log	2	weekly	1	Submit to study co-ordinator
T (Toxicity) Form	2	weekly	1	Submit to study co-ordinator
AE report		See protocol	1	Submit to study co-ordinator
Form R	2	Registration	1	Submit to study co-ordinator
1 The History and Physical It is not necessary to repeat for this study.				

STATISTICAL CONSIDERATIONS

Study Design

[0215] This is a randomized, 2-arm, double-blind, placebo-controlled phase III clinical trial evaluating THC/CBD as an aid to stopping opioid patients who are taking opioids due to chronic pain.

[0216] The overall objective of this study is to evaluate the probability of stopping opioid use within 5 weeks for patients diagnosed with chronic pain and treated with THC/CBD compared to those receiving placebo.

Treatment allocation and Emergency Unblinding

[0217] The subjects enrolled into this study will receive either daily THC/CBD or a placebo. The study treatments will be sequentially allocated from predetermined lists consisting of randomly permuted study treatments within blocks. This allocation procedure will tend to allocate each of the study regimens to nearly an equal number of the enrollees. Other than blocking the treatments, the randomization procedure will not be otherwise constrained to provide an equal number of subjects in each treatment group. The randomized treatment for each individual will remain concealed unless there arises a need for emergency unblinding. Emergency unblinding occurs when the appropriate clinical care of the subject requires knowledge of her study treatment. The study's Principle Investigator will be responsible for reviewing and approving requests for emergency unblinding. An independent statistician will be responsible for revealing the study treatment.

Measures of Efficacy and Safety

[0218] The principal observation for evaluating the therapeutic efficacy and safety of the study regimens are:

Primary Endpoints:

Primary efficacy endpoint: cessation of opioids for at least 7 days as determined by the treating physician.
Primary safety endpoint: Common Terminology Criteria for Adverse Events (CTCAE) - version 4.0.

Secondary Endpoints:

Weekly morphine equivalency does (MED).
Pain Numeric Score (PNS)

Enrollment and Target Sample Size

[0219] The target enrollment for this study is 64 subjects. The estimated accrual rate is 6 subjects per month. At this rate the enrollment period for this study is expected to require at most 1year.

[0220] In order to account for the loss in power due to non-compliance, the target sample size will be increased by 2 subjects for each subject who withdraws from the study prior to completing at least 4 weeks of treatment or cannot be adequately evaluated for opioid usage.

Study Hypotheses

[0221] *Null Hypotheses for Primary Efficacy Endpoint:*

[0222] Ho: THC/CBD does not increase the probability of stopping opioids within 5 weeks of starting THC/CBD compared to placebo.

Type I Error Allocation

[0223] The type I error for the primary efficacy hypothesis will be 0.025 for a one-tail test.

Analytic Procedures for Testing Hypothesis (H0)

Primary Analysis:

[0224] For the primary analysis subjects will be group according to their randomly assigned treatment and they will be included in the analysis, regardless of their compliance with their assigned treatment plan. Individuals who withdraw early from the study without stopping opioids will be classified in the analysis of the primary endpoint as treatment failures (i.e., not stopping opioids).

[0225] Inferences regarding the clinical significance of THC/CBD will be made based on a Fisher's exact test of the primary study hypothesis.

Secondary and Exploratory analyses:

[0226] A logistic model will be used to assess whether the subject's initial morphine equivalency dose (MED), age or other clinical or demographic factors are treatment effect modifiers.

[0227] A linear mixed model will be used to model the patients' weekly morphine equivalency dose over time for women randomized to placebo vs those randomized to THC.

Statistical Power

[0228] With 32 subjects treated on each of the study regimens, this design provides 82% chance of rejecting the primary null hypothesis for efficacy when the true probabilities of stopping opioids within 5 weeks are 5% and 35% for placebo and active, respectively.

Interim Analyses

[0229] An interim futility analysis will be performed when there are at least 16 subjects treated and evaluated in each of the randomized treatment groups. If the proportion of the subjects randomly assigned to placebo who stopped all opioid usage within 5 weeks is greater than or equal to the proportion of subjects on THC/CBD, then consideration will be given to stopping the study. Otherwise, the study will continue to accrue until the target enrollment has been attained. If the study is stopped early due to this stopping boundary, then the conclusion of the study will be that it is unlikely that THC/CBD increases the probability of stopping opioid use in patients with chronic pelvic pain

[0230] If the true probability stopping opioids on THC/CBD is equal to placebo, then there is a 64% chance that this stopping boundary will recommend stopping the study early. On the other hand, if the true probabilities for stopping opioids are 5% and 35% on placebo and THC/CBD, respectively, then this stopping boundary decreases the statistical power of the study by less than 0.5%.

[0231] Interim and final reports will include an accounting of all subjects registered onto the study, regardless of their eligibility status or compliance to their assigned treatment.

[0232] The Data Monitoring Committee (DMC) is responsible for reviewing the results of interim analyses. The decision to terminate accrual to the study or to release study results early includes consideration of adverse events, treatment compliance, as well as results from external studies.

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[0234] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

CLAUSES

[0235]

1. A pharmaceutical composition comprising:

   (a) tetrahydrocannabinol (THC) and cannabidiol (CBD) in a THC:CBD ratio of from 1:1.5 to 3:1 by weight; and
   (b) one or more terpenes listed in Table 1.

2. The pharmaceutical composition of clause 1, wherein the THC:CBD ratio is from 1.5:1 to 2:1.
3. The pharmaceutical composition of clause 1, wherein the THC:CBD ratio is about 1.5:1.
4. The pharmaceutical composition of any one of clauses 1-3, wherein the pharmaceutical composition comprises about 15- 20 mg tetrahydrocannabinol (THC) per dose.
5. The pharmaceutical composition of any one of clauses 1-4, wherein the pharmaceutical composition comprises 10 - 12 mg cannabidiol (CBD).
6. The pharmaceutical composition of any one of clauses 1-5, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, α-humulene, linalool, p-cymene, camphene, cis-nerolidol, terpinolene, isopulegol, caryophyllene oxide, δ-limonene, geraniol, guaiol, α-bisabolol, 3-carene, β -pinene, γ-terpinene, or a combination thereof.
7. The pharmaceutical composition of any one of clauses 1-5, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, and α-humulene.
8. The pharmaceutical composition of any one of clauses 1-7, wherein the one or more terpenes comprise β-myrcene, and wherein the pharmaceutical composition comprises 30 - 60 mg of β-myrcene per dose.
9. The pharmaceutical composition of any one of clauses 1-8, wherein the one or more terpenes comprise β-caryophyllene, and wherein the pharmaceutical composition comprises 2.5 - 5 mg of β-caryophyllene per dose.
10. The pharmaceutical composition of any one of clauses 1-9, wherein the one or more terpenes comprise ocimene, and wherein the pharmaceutical composition comprises 2.3 - 4.7 mg of ocimene per dose.
11. The pharmaceutical composition of any one of clauses 1-10, wherein the one or more terpenes comprise α-pinene, and wherein the pharmaceutical composition comprises 1.1 - 2.1 mg of α-pinene per dose.
12. The pharmaceutical composition of any one of clauses 1-11, wherein the one or more terpenes comprise α-humulene, and wherein the pharmaceutical composition comprises 0.8 - 1.6 mg of α- humulene per dose.
13. The pharmaceutical composition of any one of clauses 1-12, wherein the one or more terpenes comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, and α-humulene; and wherein the pharmaceutical composition comprises about 30 - 60 mg of the β-mycene, about 2.5 - 5 mg of the β-caryophyllene, about 2.3 - 4.7 mg of the ocimene, about 1.1- 2.1 mg of the α-pinene, and about 0.8 - 1.6 mg of the α-humulene per dose.
14. The pharmaceutical composition of any one of clauses 1-13, wherein the pharmaceutical composition is formu-

lated as a liquid, a pill, a gel capsule, a vaporizable liquid, a vaporizable solid, a transdermal ointment or salve, or a transdermal patch.

15. The pharmaceutical composition of any one of clauses 1-13, wherein the pharmaceutical composition is formulated as a liquid.

16. The pharmaceutical composition of clause 15, wherein the liquid comprises citric acid, blue agave, glycerine, one or more lorann oils, food coloring, or a combination thereof.

17. The pharmaceutical composition of clause 15, wherein the liquid comprises:

(a) about 1% to 7% w/w citric acid;
(b) about 40% to 49% w/w blue agave;
(c) about 40% to 49% w/w glycerin;
(d) about 0.1% to 1.5 % w/w lorann oils;
(e) about 0.01 to 0.4% food coloring;
(f) or a combination thereof.

18. The pharmaceutical composition of clause 15, wherein the liquid comprises:

(a) about 3 - 5% w/w citric acid;
(b) about 45 - 49% w/w blue agave;
(c) about 45 - 49% w/w glycerin;
(d) about 0.7 - 0.9% w/w lorann oils; and
(e) about 0.1 - 0.3% food coloring.

19. The pharmaceutical composition of any one of clauses 1-18, for use in the treatment of opioid addiction.

20. The pharmaceutical composition of any one of clauses 1-18, for use in the treatment of pain.

21. The pharmaceutical composition of any one of clauses 1-18, for use in the treatment of chemotherapy-induced nausea and vomiting.

22. A method of treating opioid addition, the method comprising administering an effective amount of a pharmaceutical composition comprising one or more cannabinoids to a subject in need thereof.

23. The method of clause 22, wherein the pharmaceutical composition is the pharmaceutical composition of any one of clauses 1-18.

24. The method of clause 22 or 23, wherein the pharmaceutical composition is administered every 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, or 24 hours.

25. The method of clause 22 or 23, wherein the pharmaceutical composition is administered every 6, 8 or 12 hours.

26. The method of any one of clauses 22-25, wherein the subjects opioid use decreases by at least 50% within 5 weeks of beginning treatment as determined by morphine equivalency of opioids used.

Claims

1. A liquid pharmaceutical composition in dose form comprising:

(a) 15 - 20 mg of tetrahydrocannabinol (THC) and 10 - 12 mg of cannabidiol (CBD); and
(b) one or more terpenes which comprise β-myrcene, β-caryophyllene, ocimene, α-pinene, and α-humulene.

2. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises 30 - 60 mg of β-myrcene per dose.

3. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises 2.5 - 5 mg of β-caryophyllene per dose.

4. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises 2.3 - 4.7 mg of ocimene per dose.

5. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises 1.1 - 2.1 mg of α-pinene per dose.

6. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises 0.8 - 1.6 mg of α-

humulene per dose.

7. The pharmaceutical composition of any of the previous claims, wherein the pharmaceutical composition comprises 30 - 60 mg of the β-mycene, 2.5 - 5 mg of the β-caryophyllene, 2.3 - 4.7 mg of the ocimene, 1.1 - 2.1 mg of the α-pinene, and 0.8 - 1.6 mg of the α-humulene per dose.

8. The pharmaceutical composition of claim 1, wherein the liquid further comprises citric acid, blue agave, glycerine, one or more lorann oils, food coloring, or a combination thereof.

9. The pharmaceutical composition of claim 8, wherein the liquid comprises:

(a) about 1% to 7% w/w citric acid;
(b) about 40% to 49% w/w blue agave;
(c) about 40% to 49% w/w glycerin;
(d) about 0.1% to 1.5 % w/w lorann oils;
(e) about 0.01 to 0.4% food coloring;
(f) or a combination thereof.

10. The pharmaceutical composition of claim 8, wherein the liquid comprises:

(a) about 3 - 5% w/w citric acid;
(b) about 45 - 49% w/w blue agave;
(c) about 45 - 49% w/w glycerin;
(d) about 0.7 - 0.9% w/w lorann oils; and
(e) about 0.1 - 0.3% food coloring.

11. The pharmaceutical composition of any one of the previous claims, for use in the treatment of pain.

12. The pharmaceutical composition of any one of the previous claims, for use in the treatment of chemotherapy-induced nausea and vomiting.

13. The pharmaceutical composition for use according claim 11 or 12, wherein the pharmaceutical composition is administered every 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, or 24 hours.

14. The pharmaceutical composition for use according claim 11 or 12, wherein the pharmaceutical composition is administered every 6, 8 or 12 hours.

Correlation between weeks passed and decrease of narcotics taken R^2=0.9868

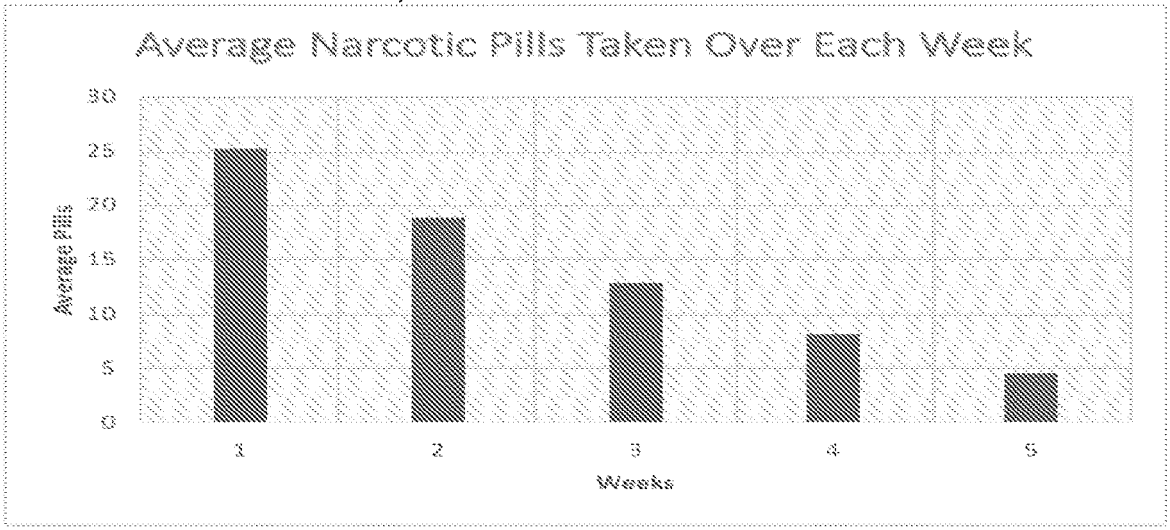

Fig. 1a

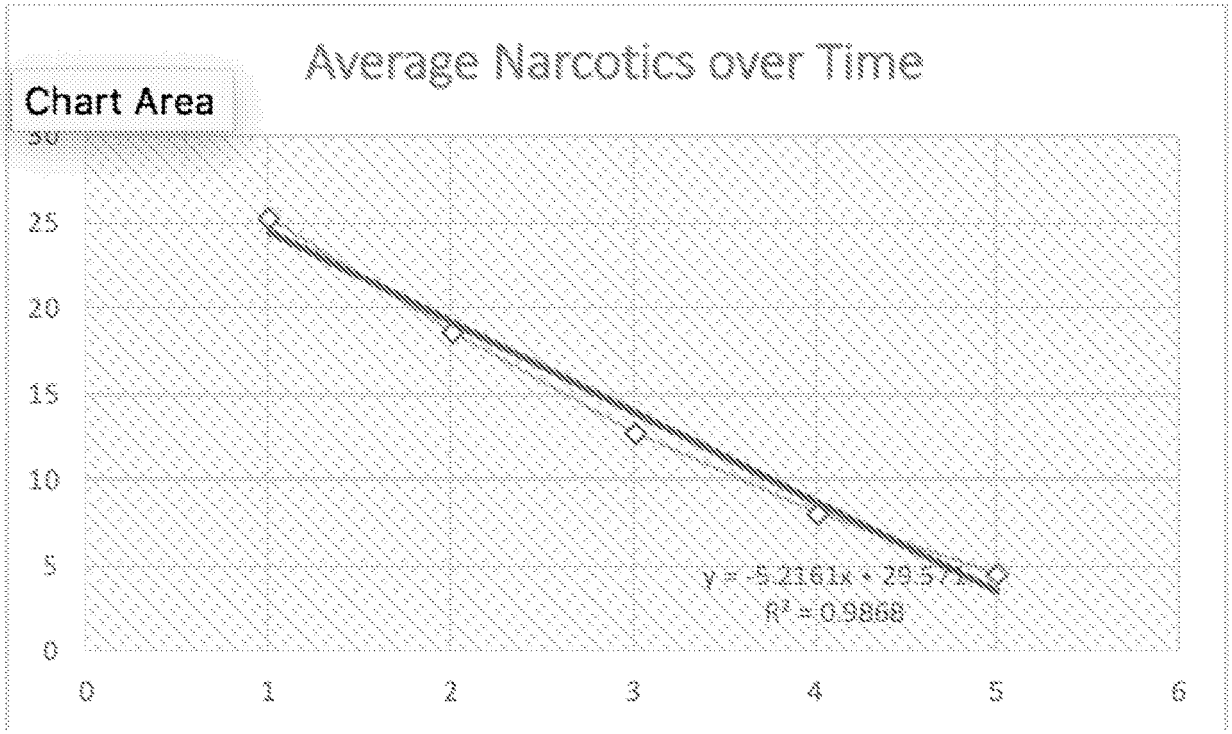

Fig. 1b

	Starting	Week 1	Week2	Week 3	Week 4
Average	491.16	379.08	268.66	164.33	96.04
Medium	368	300	210	126	70
SD (+/-)	301.15	279.53	255.3761	213.33	141.01
High	1231	1080	1080	10800	630
Low	300	140	0	0	0

Fig. 2a

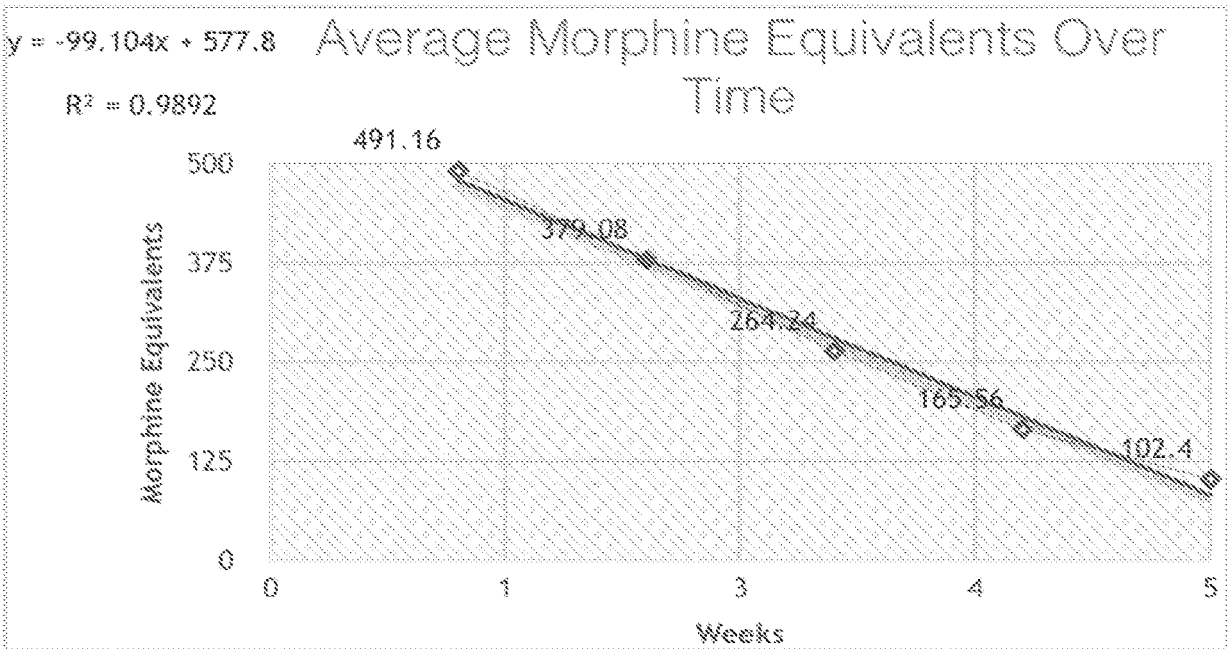

Fig. 2b

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